

EXHIBIT H

Environmental Issues of OFTI and Impact on ST Paper

July 30, 2015

On August 30, 2006, Tod Maurina of OFTI had sent a letter to WDNR stating their intent to upgrade WWTP system upon completion of change of ownership of the mill. In January 29, 2007 OFTI received an upgrade proposal from Voith. These upgrades were not carried out by OFTI and consequently ST Paper has to back down its Recycling Fiber plant so it produces 50 ton less fiber per day.

Brian Crawford

From: Ron VanDenHeuvel [rvdh@pcdiwi.com]
Sent: Sunday, October 29, 2006 12:33 PM
To: 'Sharad Tak'; 'Alok Mathur'
Attachments: st ebitda 10-29-06.xls

Now

	<u>Ron's</u>	<u>Alok's</u>
Tons Per Day	184.0	199.6
Annual tons	66,240	71,872
Avg price per ton	\$849.00	\$834.00
Avg cost per ton	\$588.00	\$573.00
Avg Margin (EBITDA) per ton	\$261.00	\$261.00
Annual EBITDA	\$17,288,640	\$18,758,592

After

	<u>Ron's</u>	<u>Alok's</u>
Tons Per Day	212.0	234.0
Annual tons	76,320	84,400
Avg price per ton	\$848.00	\$824.00
Avg cost per ton	\$572.00	\$547.83
Avg Margin (EBITDA) per ton	\$276.00	\$276.17
Annual EBITDA	\$21,064,320	\$23,308,748

Environmental
Resources
Management

August 30, 2006
Reference: 0053356

Mr. Steve Dunn
Permits Section Leader
Wisconsin Department of Natural Resources
101 South Webster Street
Madison, WI 53703

Subject: Submittal of Permit to Construct Application
Proposed Facility Modification
EcoFibre, Inc.
De Pere, Wisconsin

4650 West Spencer Street
Appleton, WI 54914
(920) 882-8386
(920) 882-8388 (fax)
<http://www.erm.com>



Dear Mr. Dunn:

On behalf of EcoFibre, Inc., Environmental Resources Management (ERM) is submitting this Application for Permit to Construct to install and operate Specific facility modifications at the EcoFibre facility in De Pere, Wisconsin. Please find three (3) copies enclosed for your use and review.

Please note that this application replaces the proposed modifications that were recently permitting under 05-RV-039; the new plans for facility expansion have changed since that permit, as described in this application. There were enough differences such that a new permit application was necessary, rather than a request for a permit revision.

A check in the amount of \$1,350 for the application submittal fee is included with this application. EcoFibre is requesting an expedited review of this application.

The information provided includes a description of the project, estimated air emissions, brief discussion of primary applicable requirements – including LACT for affected pollutants on the paper machine process, and associated permit forms.

Environmental
Resources
Management

Mr. Steve Dunn
WDNR
August 30, 2006
Page 2 of 2

Please review this material and contact either Steve Peters at (920) 983-8379 or myself at (920) 882-8386 if you have any questions.

Sincerely,



Daniel R. Guido
Senior Project Manager

DRG:drg

Enclosures

cc: Steve Peters – EcoFibre, Inc.
Ron Van Den Heuvel – EcoFibre, Inc.
Randy Matty – WDNR NER

**Environmental
Resources
Management**

4650 West Spencer Street
Appleton, WI 54914
(920) 882-8386
(920) 882-8388 (fax)
<http://www.erm.com>



September 26, 2006
Reference: 0053356

Mr. Mark Wayner, P.E.
Manager of Air Quality
PA Department of Environmental Protection
Southwest Regional Office
400 Waterfront Drive
Pittsburgh, PA 15222-4745

Subject: Submittal of Plan Approval Application
Proposed Wastepaper Pulping and Tissue Making
Facility
ST Papers LLC-Northeastern Plant
Uniontown, Pennsylvania

Dear Mr. Wayner:

On behalf of ST Paper LLC (ST Paper), Environmental Resources Management (ERM) is submitting this Plan Approval Application. Enclosed please find three copies of a Plan Approval Application for the proposed ST Paper Northeast facility to be located in Uniontown, Fayette County, Pennsylvania. Also enclosed is a check for \$1,000, made payable to the "Commonwealth of PA Clean Air Fund". Please note that all required material, including municipal notifications and the compliance review form, are included as Attachments to the application. Once the return receipts from the municipal notifications are received they will be forwarded to your office.

The Plan Approval Application is for the installation of 2 tissue machines, a waste paper deinking/hydropulping system and auxiliary equipment including a boiler to support the tissue machine operations. The maximum capacity of the proposed facility is 100 TPD per tissue machine, for a total of 200 TPD for the facility.

The area where the facility is proposed is currently non-attainment for ozone only. However, ST Paper Northeast plans to take synthetic minor limits on the emissions from the facility in order to remain a minor source under Title V, MACT, and NSR/PSD.

ST Paper Northeast is proposing to track production on a monthly basis in order to show compliance with the rolling 12-month production limitation of 36,500 TPY from each tissue machine for a total of 73,000 TPY for the deinking /hydropulping process.

Environmental
Resources
Management

Mr. Mark Wayner
PDEP

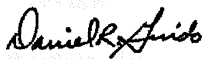
September 26, 2006

Page 2 of 2

In order to comply with the requirements in PA code, ST Paper Northeast has conducted BAT determinations for each new emission unit. The results of these determinations are included in the attached report.

Please review this material and contact either Steve Peters at (920) 983-8379, Nicole Hamilton at (614) 985-3702, or myself at (920) 882-8386 if you have any questions.

Sincerely,



Daniel R. Guido
Senior Project Manager

DRG:drg

Enclosures

cc: Steve Peters - ST Paper LLC
Ron Van Den Heuvel - ST Paper LLC

Environmental
Resources
Management

September 8, 2006
Reference: 0053356

4650 West Spencer Street
Appleton, WI 54914
(920) 882-8386
(920) 882-8388 (fax)
<http://www.erm.com>

Mr. Richard Sprott
New Source Review Section
Utah Division of Air Quality
PO Box 144820
Salt Lake City, UT 84114-4820



Subject: Submittal of NOI
St Tissue, Inc.
St. George, UT Project Site

Dear Mr. Sprott:


On behalf of ST Tissue, Inc., Environmental Resources Management (ERM) is submitting this NOI to install and operate a new tissue mill in St. George, Utah. Please find one (1) copy enclosed for your use and review.

A check in the amount of \$1,900 for the application submittal fee is included with this application. ST Tissue is requesting an expedited review of this application.

The information provided includes a description of the project, estimated air emissions, discussion of BACT for affected pollutants on the proposed processes, and associated permit forms.

Please review this material and contact either Steve Peters at (920) 983-8379 or myself at (920) 882-8386 if you have any questions.

Sincerely,


Daniel R. Guido
Senior Project Manager

DRG:drg

Enclosures

cc: Ron Van Den Heuvel - St Tissue, Inc.

DEC 18 '06 8:20 FROM OCONTO FALLS TISSUE TO 14142735198 PAGE.002/002



State of Wisconsin \ DEPARTMENT OF NATURAL RESOURCES

Jim Doyle, Governor
 Scott Hassett, Secretary
 Ronald W. Kazmierczak, Regional Director

Northeast Region Headquarters
 2984 Shawano Ave., P.O. Box 10448
 Green Bay, Wisconsin 54307-0448
 Telephone 920-662-5100
 FAX 920-662-5413
 TTY 920-662-5112

December 7, 2006

MR STEVE LEA PLANT MANAGER
 OCONTO FALLS TISSUE INC
 106 EAST CENTRAL AVENUE
 OCONTO FALLS, WI 54154

Casetrack# 2006-NEEE-005
 WPDES Permit: WI-0000531
CERTIFIED MAIL
 Return Receipt Requested

Subject: **RESPONSE REQUESTED**

Dear Mr. Lea:

The purpose of this letter is to request an update from you regarding the compliance status of the Oconto Falls Tissue, Inc. (OFTI) wastewater treatment facility. Since the date of the enforcement conference (March 23, 2006) OFTI has taken limited steps to upgrade its facility but still has recurring permit exceedances.

By no later than Monday, December 18, 2006, please provide to me at the address in the letterhead your written commitment to remain in compliance and definitive steps you will take to do so.

As previously stated, the Department is very concerned about the ongoing wastewater exceedances by OFTI, the length of time that the exceedances have continued and the lack of appropriate response. If you fail to return to compliance, State law leaves the Department with few options other than to escalate enforcement actions.

Please be advised that the Department is authorized to seek injunctive or other appropriate relief for violations of pollution discharge elimination laws, including forfeitures of no more than \$10,000 per day of violation, pursuant to s. 283.91(2), Wis. Stats. Any person who willfully or negligently violates laws relating to pollution discharge elimination may be fined not more than \$25,000 per day of violation or imprisoned for not more than 6 months or both, pursuant to s. 283.91(3), Wis. Stats. Each day of violation is considered a separate offense.

If you have technical questions regarding your wastewater system, please contact Wastewater Engineer Mr. Bruce Oman at (715) 582-5012. If you have questions regarding this letter, please contact me at (920) 662-5409.

Sincerely,

Karl P. Roovers
 Environmental Enforcement Specialist

Cc: B. Oman - Peshtigo
 R. Stoll - NER
 C. Hammer - LS/5
 WT/2

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 wisconsin.gov

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** TOTAL PAGE.002 **

ST PAPER 1253



State of Wisconsin | DEPARTMENT OF NATURAL RESOURCES

Jim Doyle, Governor
Scott Hassett, Secretary

101 South Webster Street
P.O. Box 7921
Madison, WI 53707-7921
Telephone (608) 266-2621
FAX (608) 267-3579
TTY Access via relay - 711

December 6, 2006

IN REPLY REFER TO: S-2006-1047

Mr. Stephen Lea
Plant Manager
Oconto Falls Tissue, Inc.
106 E. Central Ave.
Oconto Falls, WI 54154

Dear Mr. Lea:

The Division of Water is conditionally approving plans for an improvement to the existing wastewater treatment facilities serving Oconto Falls Tissue located at Oconto Falls, Wisconsin. The plans were submitted under the signature of Thomas E. Vik, Professional Engineer, McMahon Associates, Neenah, Wisconsin, and received for approval on December 4, 2006.

A new 12 inch PVC pipe will be installed to allow gravity flow of mixed liquor from the existing 90 ft. diameter aeration tank trough to the existing 60 ft. diameter final clarifier center well. This change will eliminate the need for the current procedure for transferring mixed liquor to the final clarifier by pumping from an undersized wet well. The current practice of pumping mixed liquor has been reported to destroy floc resulting in periodic loss of solids over the final clarifier weir and inability to maintain a consistent MLSS concentration in the aeration tank.

The proposed improvement has been indicated to be an interim measure and is not being approved as a substitute for proposed extensive final clarifier improvements (listed below) approved by the Division of Water in a plan approval (No. S-2006-0644) dated August 10, 2006.

Final Clarifier Upgrades (from Plan Approval No. S-2006-0644 dated August 10, 2006)

- *Convert an existing intermediate 60 ft. diameter clarifier tank with a 12 ft. side water depth (not currently in use) into a new final clarifier with rapid sludge removal by installing new clarifier mechanisms and appurtenances (Riser Bro clarifier). Piping will also be reconfigured to allow gravity flow from the aeration basin to the new final clarifier.*
- *The existing 60 ft. diameter final clarifier currently in use will be converted to a second standby/stormwater final clarifier for peak flow events.*

The plans and specifications are hereby approved in accordance with s. 281.41, Stats., as attested by affixing on them the stamp of approval, Number S-2006-1047, subject to the following conditions:

1. That all existing treatment facilities be operated as effectively as possible during the course of the construction period and that the proposed system be operated effectively when it is placed in operation.
2. That the Department's Basin Wastewater Engineer, Bruce Oman in Peshtigo, be notified when construction has commenced and again when the facilities are placed in operation.

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3. That all solids and sludges resulting from the treatment of these wastewaters be disposed of in accordance with ch. NR 214, Wis. Adm. Code (Land Application of Industrial Wastes) and the WPDES permit for the facility or any applicable Solid and Hazardous Waste Regulations (in chs. NR 500 to 590 and 600 to 690, Wis. Adm. Codes).
4. That the Water Management Investigator of the Northeast, Robert Rosenberger in Peshtigo, be contacted to determine whether permits under ch. 30, Stats. are required and, if needed, that no construction begin until such permits are obtained.
5. That a competent resident inspector be provided during the course of construction.
6. That the improvement(s) be installed in accordance with the plans and specifications and above conditions, or subsequent essential and approved modifications.

These plans and specifications have been reviewed in accordance with s. 281.41, Stats. Where necessary, plans and specifications should be submitted to the Department of Commerce, Division of Buildings and Safety or other state or local agencies to insure conformance with applicable codes or regulations of such agencies.

The Division of Water reserves the right to order changes or additions should conditions arise making this necessary.

This approval is not to be construed as a Department determination on the issuance of a Wisconsin Pollutant Discharge Elimination System permit or an opinion as to the ability of the proposed system to comply with effluent limitations in such permit, or an approval for any activities requiring a permit under ch. 30 or 31, Stats.

Tangible personal property which becomes part of a waste treatment or pollution abatement plant or equipment, may be exempt from sales tax under s. 77.54(26), Stats. Similarly, property purchased or constructed as a waste treatment facility and used for the treatment of industrial wastes may be exempt from general property taxes under s. 70.11(21)(a), Stats. A prerequisite to exemption is the filing of a statement on forms prescribed by the Department of Revenue. To obtain the necessary forms, and information on whether or not your property qualifies for these exemptions, please contact the Department of Revenue, P.O. Box 8933, Madison, Wisconsin, 53708.


In case installation of these improvements has not been commenced within two years from this date, this approval shall become void. After two years, therefore, new application must be made for approval of these or other plans and specifications before any construction is undertaken.

If you believe you have a right to challenge this decision made by the Department, you should know that Wisconsin statutes, administrative codes and case law establish time periods and requirements for reviewing Department decisions.

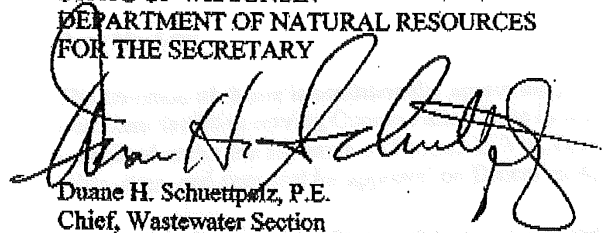
To seek judicial review of the Department's decision, sections 227.52 and 227.53, Stats., establish criteria for filing a petition for judicial review. Such a petition shall be filed with the appropriate circuit court and shall be served on the Department. The petition shall name the Department of Natural Resources as the respondent.

** TOTAL PAGE.004 **

To request a contested case hearing pursuant to section 227.42, Stats., and ch. NR 2, Wis. Adm. Code, you have 30 days after the decision is mailed, or otherwise served by the Department, to serve a petition for hearing on the Secretary of the Department of Natural Resources. The filing of a request for a contested case hearing is not a prerequisite for judicial review.


David Hantz, P.E.
Wastewater Engineer
Wastewater Section

STATE OF WISCONSIN
DEPARTMENT OF NATURAL RESOURCES
FOR THE SECRETARY


Duane H. Schuettpatz, P.E.
Chief, Wastewater Section
Bureau of Watershed Management

cc: Northeast
Bruce Oman
Permit File
Tom Vic, McMahon Assoc.
Plan File (2 copies)

SPECIFICATIONS MANUAL

WASTEWATER TREATMENT PLANT MODIFICATIONS

At The

OCONTO FALLS TISSUE MILL

Oconto Falls, Wisconsin

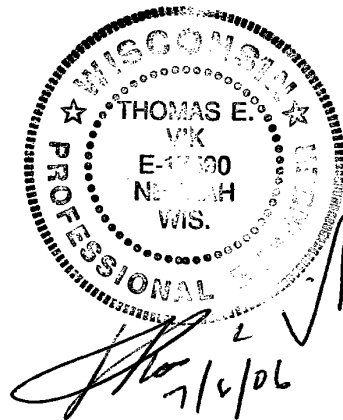
McMAHON
ASSOCIATES
ENGINEERS | ARCHITECTS | SURVEYORS | PROJECT MANAGERS

June 20, 2006
McM. No. S1066-960499
TEV:car:smdt

SPECIFICATIONS MANUAL:

WASTEWATER TREATMENT PLANT MODIFICATIONS

At The
OCONTO FALLS TISSUE MILL
Oconto Falls, Wisconsin



Prepared By:

McMAHON

McMahon Associates, Inc.
Engineers / Architects / Land Surveyors

June 20, 2006

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TEV:car:smdt
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TABLE OF CONTENTS

DIVISION 2 - SITE WORK

DIVISION 11 - EQUIPMENT

DIVISION 13 - SPECIAL CONSTRUCTION

DIVISION 15 - MECHANICAL

DIVISION 16 - ELECTRICAL

DIVISION 2 - SITE WORK

Page 1

SECTION 02100 - SITE PREPARATION & EROSION CONTROL

PART 1 - GENERAL

1.01 Description.

PART 2 - PRODUCTS

Not Applicable.

PART 3 - EXECUTION

3.01 General.

SECTION 02200 - EARTH WORK

PART 1 - GENERAL

1.01 Description.

PART 2 - PRODUCTS

Not Applicable.

PART 3 - EXECUTION

- 3.01 Protection of Existing Structures & Utilities.
- 3.02 Waste or Excess Material Disposal.
- 3.03 Site Grading.
- 3.04 Pipe Line Trenching, Backfilling & Compacting.

SECTION 02734 - UNDERGROUND PLANT & PROCESS PIPING

PART 1 - GENERAL

1.01 General.

PART 2 - PRODUCTS

2.01 Pipe Fittings & Valve Specifications.

PART 3 - EXECUTION

- 3.01 Receiving & Storing Pipe & Accessories.
- 3.02 Handling Of Pipe & Accessories.
- 3.03 Lowering Pipe & Accessories Into Trench.
- 3.04 Laying Of Pressure Pipe.
- 3.05 Setting Valves.
- 3.06 Testing Of Pressure Pipe.
- 3.07 Final Inspection.

SECTION 02100

SITE PREPARATION & EROSION CONTROL

PART 1 - GENERAL

1.01 DESCRIPTION

- A. This work shall consist of clearing the intended work area of selected trees, vegetation, buildings, structures and debris occurring within the project limits, as designated by the OWNER or their representative, and disposing of the same in conformance with applicable ordinances and codes. This section also covers erosion control for all earthwork operations.

PART 2 - PRODUCTS

Not Applicable.

PART 3 - EXECUTION

3.01 GENERAL

- A. Erosion Control
1. Perform erosion control measures to control water pollution, erosion and siltation through the use of intercepting embankments, berms, dikes, dams, silt fences, settling basins, slope paving, ditch checks, rip-rap, mulches, erosion mats, seeding, sodding, plantings and other erosion control devices or methods.
 2. Temporary erosion control measures coordinate with permanent erosion control measures to assure economical, effective and continuous erosion control.
 3. Submit a detailed plan and schedule of construction operations for accomplishing temporary and permanent erosion control work relating to grubbing, grading, excavation, paving and other work which might create erosion.
 4. Minimize the area of erosive land exposed to the elements, and the duration of such exposure.
 5. Perform construction in and adjacent to rivers, streams, lakes or other waterways in such a manner as to avoid washing, sloughing or deposition of materials into waterways which would result in undue or avoidable contamination, pollution or siltation of such waterways.
 6. Perform grubbing and grading operations in proper sequence with other work to minimize erosion. Construct intercepting ditches or dikes, as soon as practical, after clearing and grubbing operations are completed.
 7. Construct erosion control facilities in accordance with Wisconsin Construction Site Best Management Practice Handbook.

END OF SECTION

SECTION 02200

EARTH WORK

PART 1 - GENERAL

1.01 DESCRIPTION

- A. This section outlines acceptable methods for the excavating, placing, grading, stabilizing and compacting of earth at the project site.

PART 2 - PRODUCTS

Not Applicable.

PART 3 - EXECUTION

3.01 PROTECTION OF EXISTING STRUCTURES & UTILITIES

- A. All surface and features, including buildings, pavements, trees and shrubs, adjacent to the construction easement or right-of-way, and those within the construction easement or right-of-way, which are to be saved as indicated on the drawings or by the ENGINEER/ARCHITECT shall be properly protected against all damage.
- B. All existing gas pipes, water pipes, steam pipes, electric and telephone conduits, sewers, drains, culverts, valves, water and sewer service laterals, hydrants and other surface or subsurface structures, either of a private or of public ownership, whether or not indicated or shown on the drawings, shall be carefully supported and protected from injury by the CONTRACTOR. All such work shall be done by, at the expense of the CONTRACTOR, and according to their own drawings. The fact that the OWNER may be under no legal obligation to provide for doing such work will be no excuse for the CONTRACTOR neglecting or refusing to perform the same.
- C. Whether shown on the drawings or not, the CONTRACTOR shall contact all public utilities for the exact location of their underground structures such as ducts, mains or services for electric power, gas and telephone. Above ground poles for electric power, lighting and telephone wires and cables shall be supported by the CONTRACTOR. If such utilities or subsurface structures are damaged by the CONTRACTOR, they shall make settlement with the OWNER(s) of the utility(ies).

3.02 WASTE OR EXCESS MATERIAL DISPOSAL

- A. Surplus Earth

- 1. All surplus excavated earth is the property of the OWNER, and shall left on-site.

3.03 SITE GRADING

2. The maximum trench width 2-feet above the top of the pipe to the trench bottom shall be the outside diameter of the pipe plus 24-inches. The trench walls shall be kept vertical whenever possible. Side sloping or "benching down" of the trench will be permitted except where the trench is excavated within a permanent pavement or where such side-sloping or benching would encroach upon private property or endanger existing or future underground utilities or structures. Where side sloping or "benching down" is used, the normal trench width at the top of the pipe shall not be exceeded. The ENGINEER/ARCHITECT may prohibit side sloping or benching for any of the above reasons.
3. Trenches shall be sufficiently straight between designated angle points to permit the pipe to be laid straight and true to line and grade.
4. Where the normal trench width below 2-feet above the top of the pipe is exceeded for any reason, except due to the use of tight sheathing, the CONTRACTOR, at their own expense, shall furnish an adequate section for the actual trench width. This may be accomplished by furnishing a stronger pipe, a concrete cradle, cap or envelope or trench restoration, whichever is an adequate section. Tight sheathing may be used in lieu of a stronger pipe section to maintain the required trench width for the required height and depth. When the pipe specified is strong enough for the actual trench width, no further provision need be made for the greater trench width.
5. The trench shall be excavated to the required depth below the flow line (invert) of the pipe line being constructed allowing for the thickness of the pipe and the depth required for bedding. If the CONTRACTOR excavates too deep for underground mains the CONTRACTOR shall, at their own expense, refill all such excavated space with such material and in such manner as directed by the ENGINEER/ARCHITECT. If the specifications call for special bedding, this bedding shall be used to refill the excavated space below the main(s).
6. All backfilling shall be carried along as speedily as possible. Backfilling shall not be left unfinished more than 100-feet behind the completed pipe work unless permitted by the ENGINEER/ARCHITECT. New trenching will not be permitted when earlier trenches need backfilling or labor is needed to restore the surfaces of streets or other areas to a safe and proper condition.

B. Unstable Foundation

1. All undesirable material below the trench bottom, manhole or any structure, such as organic soils, etc., which cannot adequately support the sewer, shall be removed and replaced with crushed stone.

C. Backfilling Trenches

1. Excavated Material for Backfill
 - a. Material excavated from an open trench may be used for backfilling.
 - b. Excavated material may be used as backfill provided that such material consists of sand, loam, clay or other materials that, in the judgment of the ENGINEER/ARCHITECT, are suitable for backfilling. Unstable backfill materials include vegetable or other organic matter, all types of refuse, large pieces or fragments of concrete, large stones or boulders and such other material as in the judgment of the ENGINEER/ARCHITECT are unsuitable for backfilling. Frozen backfill material shall not be used.
 - c. The backfilling of the trench section above the bedding section of all pipe lines shall be carefully placed to a level 3-feet above the pipe to avoid disturbance to the completed pipe line. The backfill material in this section shall be free of any stones or concrete larger than 3-inches in diameter.

02200-2

- d. No rock shall be used within 10-feet of any manhole.

D. Compaction of Trench Backfill

- 1. Compaction Requirements (see Table 02200-1, located at the end of this section).
- 2. Acceptable Methods
 - a. Flooding or Jetting
 - b. Mechanical Compaction

END OF SECTION

TABLE 02200-1

Excavated Area	Percent Compaction Fine-Grained Soil	Percent Compaction Coarse-Grained Soil	Relative Density *
Within 10' of building lines under footings, floor slabs and structures attached to buildings (i.e., walls, stoops, steps) and the upper 4' or a distance twice the trench width, whichever is greater, of any trench located under any concrete or asphalt paved surfaces.	90%	95%	70%
10' beyond building lines under walks, driveways, curbing, concrete or asphalt paving, sub-grade preparation and the remaining section of any trench located under these paved surfaces.	80%	90%	60%
10' beyond building lines under seeded, sodded and landscaped areas, and any trench located under these areas.	80%	90%	---
Coarse-grained soils are classified as those soils with more than 50% (by weight) larger than the No. 200 mesh sieve and with a plastic index less than 4.			
Compaction requirements maximum density shall be determined by AASHTO Designation T99, Method C, with replacement of the fraction of material retained in the 3/4-inch sieve with No. 4 to 3/4-inch material.			
* Minimum relative density requirements apply to coarse-grained soils and apply only in cases where the percentage compaction requirements are not being reached.			

SECTION 02734

UNDERGROUND PLANT & PROCESS PIPING

PART 1 - GENERAL

1.01 GENERAL

- A. This section of the specifications covers underground plant and process piping, manholes, fittings and accessories.
- B. All pipe, manholes, fittings and accessories shall be furnished by the CONTRACTOR, complete and ready for use. All gaskets, bolts, couplings, saddles, sleeves, anchors, seals and other specialties necessary to complete the work shall be provided and considered incidental to the work.

PART 2 - PRODUCTS

2.01 PIPE FITTINGS & VALVES SPECIFICATIONS

- A. Refer to Division 15.

PART 3 - EXECUTION

3.01 RECEIVING & STORING PIPE & ACCESSORIES

- A. The CONTRACTOR shall check all pipe and accessories for loss or damage in transit when received from the carrier and at the time of unloading.
- B. The CONTRACTOR shall check all pipe for proper identification markings, as required for the specific material and that the pipe and accessories delivered to the site meet the appropriate material specifications.
- C. The CONTRACTOR shall not accept the delivered pipe and accessories until Items A and B have been satisfied.
- D. All pipe and accessories shall be stored in accordance with all storage requirements and recommendations of the pipe manufacturer.
- E. The CONTRACTOR shall use adequate and proper equipment to load/unload and distribute the pipe and accessories so as not to damage the material.
- F. All material found during the progress of work to have cracks, flaws or other defects by the CONTRACTOR, ENGINEER, authorized observer or OWNER shall be rejected and removed promptly from the construction site by the CONTRACTOR.

3.02 HANDLING OF PIPE & ACCESSORIES

- A. The CONTRACTOR shall unload and distribute pipe and accessories along the site of the work or place material in storage if necessary and then distribute. Handle all materials with care to avoid damage.
- B. The interior of all pipe shall be thoroughly cleaned of all foreign matter before being lowered into the trench. Before lowering, and while still suspended, the pipe shall be inspected for defects and rung with a light hammer to detect cracks. Any defective or damaged pipe shall be rejected.

3.03 LOWERING PIPE & ACCESSORIES INTO TRENCH

- A. The CONTRACTOR shall have sufficient and adequate equipment on the site of the work for unloading and lowering pipe and fittings into the trench. Extreme care shall be exercised by the CONTRACTOR in handling all pipe, fittings and special castings so as to prevent breakage and coating damage. Any significant damage to the coating shall be repaired before installation. Under no circumstances shall pipe or fittings be dropped into the trench or so handled as to receive hard or damaging blows. All mud or concentrations of dirt shall be removed prior to installation.
- B. Pipe shall be lowered only with the use of non-metallic slings, hooks or pipe tongs recommended by the pipe manufacturer. Under no circumstances shall pipe and fittings be dropped or dumped into trench.

3.04 LAYING OF PRESSURE PIPE

A. Laying of Polyvinyl Chloride Pipe

- 1. Where specifically allowed on the drawings or in the contract documents, PVC pressure pipe may be used. Fittings shall be of cast or ductile iron conforming to the requirements of ductile iron pipe.
- 2. The laying of PVC pipe shall be as specified below:
 - a. The inside and outside surface of each length of pipe shall be free from nicks, scratches and other surface defects and blemishes. The pipe shall be homogeneous throughout and free of any bubbles, voids or inclusions.
 - b. The jointing areas of the barrel of each length of pipe shall be free from dents or gouges.
 - c. Each pipe shall be properly machined on one (1) end so as to facilitate joining the pipe sections without damage.
 - d. The rubber gasket shall be supplied by the manufacturer and conform to the requirements of ASTM D-1869.
 - e. Sufficient pipe lubricant shall be supplied by the manufacturer for use with each joint. A light film of lubricant shall be applied to each pipe spigot before insertion into bell.
 - f. The bell end of the pipe shall be free of dirt or other foreign matter. The gasket shall be inserted with the painted edge facing toward the end of the bell. After lubricating the spigot end, each length of pipe shall be pushed home individually. The use of a backhoe bucket bearing directly against the pipe shall not be used to force the spigot home. The pipe shall be positioned so that the reference mark on the spigot end is in line with the bell end.
 - g. When cutting pipe, PVC pipe shall be cut at right angles to the centerline of the pipe with an approved saw or mechanical cutter. A coarse hand file or an approved machine tool shall be used for beveling the end similar to the factory beveled edge as supplied by the manufacturer. A reference mark equal to that as shown on the pipe of similar size supplied by the manufacturers shall be made at the proper distance from the cut end.
 - h. Maximum joint deflection shall not exceed that recommended by manufacturer, under any circumstances.

- i. The pipe shall be stored on the job site, protected from direct sunlight and excessive heat. Stored pipe shall be covered with tarps.
- j. A #10 AWG copper wire shall be installed with all PVC pipe. The wire shall be securely attached to the top of the pipe a minimum of three (3) times for each pipe length. The wire shall be grounded to all valves, fittings and hydrants.

B. Laying Mechanical Joint Ductile Iron Pipe

1. Pipe assembly and handling shall conform to the manufacturer's recommendations.
2. Clean all dirt or foreign material off of spigot and out of socket. Use a wire brush if necessary. Slip gland on pipe for a distance of about 12-inches and with the gland tip toward the joint. Place gasket about 6-inches from the end of the pipe with the small end toward the joint.
3. Insert spigot all the way into socket. The two (2) pipes should be substantially in alignment while the joint is being assembled. Center spigot in socket. Wet gasket and joint surfaces thoroughly with soapy water.
4. Slide gasket along the pipe into socket. Hand place until it is evenly seated in the socket. Always begin seating the gasket at the bottom of the joint and do not apply the gland and bolts until the gasket is definitely in place, especially in the lower half of the joint. The placing of the gasket in the socket serves to center the spigot end of the pipe in the socket, which is essential to the making of a first class joint.
5. Slide gland into position with gland lip bearing on the pipe flange and nuts on the gland. Beginning at the lower half of the joint, run up all nuts with the fingers. Before starting to tighten bolts with wrench, be sure that the gland lip is centered on the face of the gasket.
6. When tightening the bolts, the gland shall be brought up toward the pipe flange evenly maintaining approximately the same distance between the flange and the gland at all points around the socket. Partially tighten the bottom bolts first, then the top bolt, next the bolts on each side (90°) from top and bottom. Partially tighten the remaining bolts, maintaining approximately the same space between pipe flange and gland.
7. Continue tightening in steps, as above, until each bolt has been tightened to approximately 90-foot lbs. torque.

C. Laying Push-On Joint Ductile Iron Pipe

1. Pipe assembly and handling shall conform to the manufacturer's recommendations.
2. Bell must be clean and free of all foreign matter. Brush coat gasket, retaining groove and inner shoulder, with non-toxic joint lubricant recommended by the manufacturer, and approved by regulatory agencies for the specific end use.
3. Insert gasket with solid face toward installer. Use one hand to hold a loop in gasket, the other to tuck remaining portion into its groove. Press gasket firmly into lubricated groove.
4. Pull gasket forward against bell lip to be sure the gasket is completely seated. Apply generous coating of lubricant to the exposed gasket surface.

5. Clean the plain end of pipe and grind file sharp edges that might damage the gasket. Lubricant may be applied to the beveled nose of the plain end.
6. Place plain end in the companion bell and provide reasonably straight alignment. Push pipe straight home with the aid of a bar or a jack and choker slings as required for larger sizes.
7. Check the assembly. The joint is completely assembled and pressure tight when the stripe is no longer visible. Deflection shall be taken after joint is assembled.

D. Cutting of Ductile Iron Pipe

1. Pipe shall be cut at right angles to the centerline of the pipe. Cutting shall be done in a neat, workmanlike manner without damage to the pipe or lining and so as to leave a smooth end. All pipes shall be cut with an abrasive wheel, rotary wheel cutter, guillotine pipe saw, a milling wheel saw or an oxyacetylene torch. The cut end of a pipe to be used with rubber gasket joints shall be tapered by grinding or filing about 1/8-inch back at an angle of approximately 30° with the centerline of the pipe, and any sharp or rough edges shall be removed.

3.05 SETTING VALVES

- A. All valves shall be installed with valve boxes, unless valve manholes are indicated in the drawings.
- B. All valve boxes shall be cast iron material. The valve box shall be set above the pipe, so that the weight of any vehicles or traffic will not be transferred to the valve or the pipe. The bottom flared edge of the box shall be supported on each side of the valve.

3.06 TESTING OF PRESSURE PIPE

A. General

1. Before making tests, the CONTRACTOR shall make sure that all turns, intersections, ends and reductions have been restrained by proper thrust blocking. All new pipe, including hydrants and/or service piping to the curb stop shall be tested. All air shall be expelled from the mains and they shall be filled with water.

B. Hydrostatic Test

1. The hydrostatic testing of the completed pressure main shall conform to the conditions and requirements of AWWA Standard C600. The CONTRACTOR shall backfill the trench before commencing the test. The test pressure of the pipe shall be 25 psi for a test period of 2-hours. The maximum allowable length of pressure main to be tested at one time shall be 1,000-feet or the minimum distance between valves. The allowable leakage shall not exceed that amount determined by the following formula:

$$L = \frac{SDP^{0.5}}{133,200}$$

Where D = Nominal pipe diameter in inches;
 L = Allowable leakage in gallons/hour;
 P = Average test pressure (PSI); and
 S = Length of pipe to be tested.

2. A summary of allowable leakages is given the Table 02735-1, located at the end of this section.

C. Repairing Leaks & Breaks

1. Leaks and/or breaks occurring in the pipe installed under these contract documents shall be repaired by the CONTRACTOR at their own expense during the construction period and during the guarantee period.
2. All leaks, breaks or defective sections of pipe shall be repaired by cutting out the defective section or joint and replacing that section with a length of pipe of equal material. The repair sleeves at each end of replaced pipe shall be a cast iron Clow F-1208, Duo Sleeve, U.S. Pipe, or stainless steel repair clamps.

3.07 FINAL INSPECTION

- A. During construction, due care shall be taken to thoroughly clean every sewer, manhole, inlet or other accessory and to prevent any earth, sand, brick, concrete or other foreign substance from entering, obstructing or remaining in any part of the work. As the work approaches completion, the CONTRACTOR shall systematically go over the entire work and prepare it for final inspection.

END OF SECTION

DIVISION 11 - EQUIPMENT

Page 1

SECTION 11319 - SUBMERSIBLE NON-CLOG PUMPS

PART 1 - GENERAL

- 1.01 Submittals.

PART 2 - PRODUCTS

- 2.01 Acceptable Manufacturers.
- 2.02 Pump Design.
- 2.03 Pump Construction.
- 2.04 Accessories.
- 2.05 Level Control.
- 2.06 Electrical.

PART 3 - EXECUTION

- 3.01 Start-Up.
- 3.02 Guarantee.
- 3.03 Service & Parts.

SECTION 11335 - RETROFIT RISERBRO CLARIFIER

PART 1 - GENERAL

- 1.01 Scope.

PART 2 - PRODUCTS

- 2.01 Sludge Collector.
- 2.02 Design Criteria.
- 2.03 Drive.
- 2.04 Structural Members.
- 2.05 Drive Mechanism.
- 2.06 Center Pier.
- 2.07 Influent Feed Well.
- 2.08 FEDWA Energy Dissipating Baffle System.
- 2.09 Header.
- 2.10 Header Support.
- 2.11 Center Cage, Truss & Sludge Well.
- 2.12 Access Bridge, Hand-Railing & Toe Plate.
- 2.13 Surface Skimmer, Scum Trough & Skimmer Blade Ramp.
- 2.14 Electrical Controls.

PART 3 - EXECUTION

- 3.01 Acceptance Test.
- 3.02 General Items.
- 3.03 Mechanism Finish Coating.
- 3.04 Service.

SECTION 11371 - POSITIVE DISPLACEMENT BLOWERS

PART 1 - GENERAL

- 1.01 Scope.
- 1.02 Submittals.
- 1.03 Start-Up.

PART 2 - PRODUCTS

- 2.01 Manufacturer.
- 2.02 Performance.
- 2.03 Blower Construction.
- 2.04 Electric Motors.
- 2.05 Blower Skid Package.
- 2.06 Insulation.

PART 3 - EXECUTION

Not Applicable.

DIVISION 11 - EQUIPMENT

Page 2

SECTION 11380 - EPDM FLEXIBLE MEMBRANE DIFFUSER SYSTEM - AERATION BASIN #2 -

PART 1 - GENERAL

- 1.01 Scope Of Work.
- 1.02 Definitions.
- 1.03 System Description.
- 1.04 Submittals.

PART 2 - PRODUCTS

- 2.01 Manufacturers.
- 2.02 Materials.
- 2.03 Aeration Equipment.

SECTION 11390 - FINE BUBBLE AERATION EQUIPMENT - AERATION BASIN #1 -

PART 1 - GENERAL

- 1.01 Scope.
- 1.02 Submittals.
- 1.03 Definitions.
- 1.04 Guarantee & Warranty.

PART 2 - PRODUCTS

- 2.01 Manufacturers.
- 2.02 Equipment.
- 2.03 Performance Requirements

PART 3 - EXECUTION

- 3.01 Installation.
- 3.02 Field Testing.
- 3.03 Field Service.

SECTION 11319

SUBMERSIBLE NON-CLOG PUMPS

PART 1 - GENERAL

1.01 SUBMITTALS

A. Shop Drawings

1. Shop drawings shall be submitted. Submittals shall include the following:
 - a. Pump data and dimensional data.
 - b. Control panel data.
 - c. Manufacturer's installation instructions.
 - d. Performance curves.
 - e. Materials of construction.
 - f. Prime mover data.

B. Operation and Maintenance Data

1. Operation and maintenance data shall be submitted. Include operation, maintenance and installation data, replacement part numbers, electrical control diagrams and any other data required for the care and maintenance of this equipment in the field.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Pumps shall be as manufactured by A.B.S..
- B. All pumps and controls shall be furnished by a single supplier.
- C. Pumps shall be furnished as a complete system including pumps, drives, slide rail assembly and level transducers.

2.02 PUMP DESIGN

- A. Pumps shall be capable of handling final clarifier scum. The design shall be such that pumping units will be automatically connected to the discharge piping when lowered into place on the discharge connection. The pumps shall be easily removable for inspection or service, requiring no bolts, nuts or other fastenings to be removed for this purpose and no need for personnel to enter the pump well. Each pump shall be fitted with a stainless steel cable of adequate strength and length to permit raising the pump for inspection and removal along pump guide rails. Pumps shall be capable of passing a 3-inch spherical solid.
- B. Pump shall have a capacity of 100 gpm at 25-feet TDH.
- C. Pump motor shall be rated at 3 HP, 460 volt, 3 phase, 60 Hertz.

2.03 PUMP CONSTRUCTION

- A. The starter casing, oil casing and impeller shall be of gray iron construction, with all parts coming into contact with sewage protected by multiple coats of epoxy based paint. All external bolts and nut shall be of stainless steel. The inlet of the pump shall be a non-clog design, capable of passing solids, fibrous material, and heavy sludge, and be constructed with a long throughway with no acute turns. Impeller shall be of cast iron construction, two (2) vane open style, back pump-out vanes and be dynamically balanced.
- B. Each pump shall be provided with a tandem double mechanical seal running in an oil reservoir, composed of two (2) separate lapped face seals, each consisting of one (1) stationary and one (1) rotating tungsten-carbide ring with each pair held in contact by separate spring. The lower compression spring shall be protected against exposure to the pumped liquid. The seals shall require neither maintenance nor adjustment, and shall be easily replaceable. Conventional double mechanical seals with a single spring between the rotating faces, requiring constant differential pressure to effect sealing and subject top opening and penetration by pumping forces shall not be considered equal to the tandem seal specified and required.
- C. A sliding guide bracket shall be an integral part of the pumping unit and the pump casing shall have a machined connecting flange to connect with the cast iron discharge connection. The discharge connection shall be bolted to the floor of the sump and so designed as to receive the pump connecting flange without the need of any bolts or nuts. All metal parts or fasteners used in this system shall be cast iron or stainless steel. No mild steel parts shall be used. All parts of the discharge elbow assembly shall be factory coated. Nicks and scratches incurred during installation shall be touched up by the CONTRACTOR.
- D. Sealing of the pumping unit to the discharge connection shall be accomplished by a simple linear downward motion of the pump with the entire weight of the pumping unit guided to and pressing tightly against the discharge connection. No portion of the pump shall bear directly on the floor and no rotary motion of the pump shall be required for sealing. Sealing at the discharge connection by means of a diaphragm or similar method of sealing shall not be accepted as an equal to a metal-to-metal contact of the pump discharge and mating discharge connection specified and required.
- E. Pump motor shall be housed in an air or oil filled watertight casing with Class F insulated, moisture resistant windings. All three phase motors shall be dual voltage. Pump motors shall have cooling characteristics suitable to permit continuous operation in a totally or partially submerged, or snore condition. The pump shall be capable of running in a snore condition continuously. Before final acceptance, a field running test demonstrating this ability, with 24-hours of continuous operation under the above conditions, shall be performed for all pumps being supplied, if required by the OWNER or the ENGINEER/ARCHITECT.
- F. Pump shall have seal leak sensors and motor over-temperature sensors embedded in the stator. Temperature alarm condition shall shut down pump and signal alarm in control panel. Seal lake sensor if activated, shall prevent the pump from operating as the lead pump (will operate as lag pump), and shall activated a warning light.

2.04 ACCESSORIES

- A. The CONTRACTOR shall furnish and install two (2) guide bars to control the position of each pump to permit raising and lowering of each pump. Guide bars shall be 2-inch schedule 40 stainless steel pipe of adequate length to extend from the lower guide holders in each pump discharge connection to an upper guide bracket mounted on the access frame.

B. Lifting Chain

1. An adequate chain or cable made of stainless steel shall be provided for lifting the pumps. They shall be attached to the frame with a safety chain hook and shall be long enough to reach the drum of a portable hoist.

C. Portable Hoist

1. Portable hoist shall be furnished able to remove installed pumps. Hoist shall have an adjustable reach, capacity sufficient for pumps supplied and shall be supplied without a lifting cable.
2. Furnish socket to be cast into concrete or welded to access frame, able to receive hoist end during pump removal operation.

2.05 LEVEL CONTROL

- A. Pump control shall be by a submersible level transducer.

2.06 ELECTRICAL

- A. The Electrical CONTRACTOR shall be responsible for power wiring between pumps and control panel and a common alarm from the control panel to an annunciator panel. Work shall be done in accordance with Division 16 requirements.

PART 3 - EXECUTION

3.01 START-UP

- A. The CONTRACTOR furnishing and installing the submersible pumps and motors shall include in the bid price the services of a factory-trained representative of the manufacturer for a minimum period of one (1) day to be present at the time of lift station start-up and instruct the OWNER's operator as to its operation and maintenance.
- B. At start-up, check the following:
1. Inspect all rotating equipment to see that it is properly lubricated.
 2. Check rotation of all motors.
 3. Check all controls to determine that they work properly, and repair same if defective.
 4. Prepare all equipment for full time operation.
 5. Report all malfunctions to the ENGINEER.

3.02 GUARANTEE

- A. The Equipment Supplier shall guarantee all the work and materials furnished under this contract against any defects in workmanship and materials for a period of one (1) year following the date of final acceptance of the work by the OWNER.

3.03 SERVICE & PARTS

- A. Emergency service common repair parts shall be available within 24-hours from the pump supplier. Pump supplier shall stock common repair parts for the pumps and controls offered.

END OF SECTION

ELECTRIC MOTOR DATA SHEET

TO BE COMPLETED BY CONTRACTOR AND SUBMITTED WITH EQUIPMENT SUBMITTALS

ITEM No. _____			
TYPE: <input type="checkbox"/> Induction <input type="checkbox"/> Synchronous <input type="checkbox"/> Other: _____			
HORSEPOWER: _____ FLA _____ LRA _____ Number Of Phases: <input type="checkbox"/> 1 <input type="checkbox"/> 3			
VOLTAGE: <input type="checkbox"/> 120 <input type="checkbox"/> 208/230 <input type="checkbox"/> 200/230/460 <input type="checkbox"/> 2400 <input type="checkbox"/> 4160			
MIN. EFFICIENCY: 50% Load _____ 75% Load _____ 100% Load _____ <input type="checkbox"/> EPACT <input type="checkbox"/> NEMA Premium			
POWER FACTOR: 50% Load _____ 75% Load _____ 100% Load _____			
TORQUE CURVE: NEMA Design <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D Full Torque: _____ Locked Torque: _____ Breakdown Torque: _____			
INSULATION CLASS: <input type="checkbox"/> B <input type="checkbox"/> F <input type="checkbox"/> H			
SERVICE FACTOR: _____		MOUNTING: <input type="checkbox"/> Horizontal <input type="checkbox"/> Vertical	
CODE LETTER: _____			
HEAT RISE: (If Applicable) _____ C Above 40°C Ambient By _____			
BEARING: <input type="checkbox"/> Double Sealed/Shielded Bearing <input type="checkbox"/> Sleeve Type With Pressure Lubrication <input type="checkbox"/> Ring Oiled Sleeve Bearings With Oil Level Sight Glasses & Constant Level Sight Oiler <input type="checkbox"/> Other: _____			Bearing Sizes: DE: _____ ODE: _____
SPACE HEATERS: <input type="checkbox"/> Required <input type="checkbox"/> 120 Volt <input type="checkbox"/> Other _____ <input type="checkbox"/> Not Required			
ENCLOSURE: <input type="checkbox"/> TEFC <input type="checkbox"/> TENV <input type="checkbox"/> ODP <input type="checkbox"/> Explosion-Proof <input type="checkbox"/> Severe/Harsh Duty <input type="checkbox"/> Other: _____			
AREA CLASSIFICATION: <input type="checkbox"/> Non-Classified <input type="checkbox"/> Class I <input type="checkbox"/> Class II <input type="checkbox"/> Division 1 <input type="checkbox"/> Division 2 Groups: _____			
WINDINGS: <input type="checkbox"/> Random Wound <input type="checkbox"/> Form Wound			
STATOR TEMPERATURE SENSOR: <input type="checkbox"/> Temperature Switch <input type="checkbox"/> RTD <input type="checkbox"/> None			
NAMEPLATE RPM: _____			
DIRECTION OF ROTATION: (Fan End) <input type="checkbox"/> CW <input type="checkbox"/> CCW <input type="checkbox"/> Both			
TERMINAL BOX SIZE: <input type="checkbox"/> Standard <input type="checkbox"/> Oversized			
MOTOR FAN: <input type="checkbox"/> Metal <input type="checkbox"/> Standard		Country Of Origin: _____	
VFD MOTORS: Constant Torque Speed Range: _____:1 Variable Torque Speed Range: _____:1		Meets NEMA MG1, Part 31: <input type="checkbox"/> Yes <input type="checkbox"/> No	
MANUFACTURER: _____		MODEL NO. _____	

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(219) 464-8248 - Fax

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SECTION 11335**RETROFIT RISER BRO CLARIFIER****PART 1 - GENERAL****1.01 SCOPE**

- A. Under this item, U.S. Filter / Envirex Products shall furnish and deliver suction type sludge collector for installation in one (1) existing concrete settling tank, each 60' diameter x 11' side water depth. The existing tank floor has a shall pitch of 2" in 12".
- B. The sludge collector shall be as manufactured by U.S. Filter, Envirex Products of Waukesha, Wisconsin.

PART 2 - PRODUCTS**2.01 SLUDGE COLLECTOR**

- A. The sludge collector shall include:
 - 2. Drive mechanism complete with reducer, motor and overload device.
 - 3. Unitube sludge removal header.
 - 4. Sludge riser duct.
 - 5. Sludge collection box.
 - 6. Influent feed well and supports.
 - 7. Center pier complete with return sludge line.
 - 8. Center cage.
 - 9. Access bridge, including hand-railing and toe plate.
 - 10. Single surface skimmer with scum trough.
 - 11. Effluent weirs and scum baffles not included.
 - 12. Associated attachment bolts and anchor bolts for above.
- B. The sludge collector mechanism shall utilize a center drive mounted on a stationary center support pier. A welded structural steel cage attached to the drive shall support and rotate the Unitube sludge collector header and sludge collection box. The header shall be located parallel to the tank bottom and shall have a series of inlet orifices so that in a single revolution the entire tank bottom is swept clean. The header shall continuously remove the required proportional settled sludge volume to affect a uniform withdrawal over the entire radius of the tank. The header shall be hydraulically designed to remove larger volumes of sludge at greater distances from the tank center. The slowly revolving mechanism shall collect the sludge from the tank bottom and carry it through the header to the center transition box, through a riser duct, exiting into sludge collection box, located on the upper center cage. The sludge will exit the sludge box through a return pipe located at the center of the center pier. Sludge removal being accomplished by an existing variable speed pump.

2.02 DESIGN CRITERIA

- A. The hydraulics of the clarifier shall be designed to handle:

	Min.	Ave.	Max.	Peak
Effluent Flow (MGD)		0.81	1.10	1.80
Return Flow (MGD)	0.50	0.81	1.10	1.80
Mixed Liquor Flow (MGD)		1.62	2.20	3.60

- B. Maximum Headloss For Header: 1.057 ft.
- C. Minimum Flow Velocity In Header: 0.568 fps.
- D. Minimum Header Orifice Diameter: 2.25 in.
- E. Center Pier Diameter: 31.5 in. with 14 in. return line
- F. Influent Well Size: 14'9" diameter x 6'0" depth

2.03 DRIVE

- A. Internal Gear Pitch Diameter: 38"
- B. Ball Race Diameter: 42"
- C. Motor Horsepower: 0.50 HP.
- D. AGMA Rated Torque: 21,900 ft. lbs.
- E. Speed: 0.04 RPM.

2.04 STRUCTURAL MEMBERS

- A. Structural steel shall conform to ASTM A36. All steel parts shall have a minimum thickness of 3/16". Connections shall be shop welded or field bolted. Field welding will be minimal. All welding shall conform to American Welding Society Standard AWS D1.1. Steel structural components shall be designed so that stresses developed do not exceed allowable stresses, as defined by current AISC standards when designed for the AGMA rated torque.

2.05 DRIVE MECHANISM

- A. The drive mechanism shall be completely factory assembled and shall consist of a primary gear reduction unit, an intermediate reduction unit, plus a final reduction unit consisting of a pinion and internal gear enclosed in a turntable base. All gearing shall be enclosed in gray cast iron ASTM A-48 Class 40B housings.
- B. The primary reduction unit shall be a helical heavy duty gear reducer. All bearings shall be anti-friction type and running in oil in a cast iron housing.
- C. The motor shall be totally enclosed, ball bearing type, of ample power for starting and continuously operating the mechanism without overloading. The motor shall conform to NEMA standards and be suitable for operation on 230/460 volt, 3 phase, 60 Hertz current.
- D. The primary reduction gear reducer shall drive the intermediate reduction unit through a chain and sprocket arrangement. The drive chain shall be #80L self-lubricated roller chain and be covered with a non-corrosive OSHA approved removable guard. Proper chain tension shall be provided for by an adjustable steel base mounted on the intermediate reduction unit.
- E. The intermediate reduction unit shall be a heavy-duty, worm gear speed reducer in a gray cast iron housing, with grease and oil lubricated, anti-friction type bearings. The unit shall be mounted on a machined face on the top of the final reduction unit and properly aligned to maintain accurate centers for the final reduction gearing.

- F. An overload device shall be mounted on the drive head at the thrust end of the worm shaft and shall consist of: a plate spring assembly, a plunger, indicator dial, two (2) microswitches (one N.O. and one N.C.), and a terminal block, all enclosed in a weather-tight, gray cast iron housing, gasketed and mounted to the gear housing. The end thrust of the worm shaft against the plate spring shall actuate the plunger, which in turn shall move the indicator dial.
- G. A visual torque dial indicator shall be provided and oriented so it may be read from the walkway.
- H. The microswitches shall be factory set to: 1) sound an alarm when the load on the mechanism reaches 100% of the AGMA rated torque capacity of the drive; and 2) to stop the motor when the load reaches 120% of the AGMA rated torque capacity.
- I. A shear pin device, set for 130% of the AGMA rated torque shall be furnished.
- J. The internal final gear shall be driven by a heat-treated steel pinion from the slow speed shaft of the intermediate gear reduction unit. The internal gear shall be split for easy removal, shall be of ductile iron and shall be designed to support the center cage and collector.
- K. The turntable base shall have an annular raceway to contain balls upon which the internal gear rotates. The ball race shall ensure a low unit ball load, long life and stability, without the necessity of guide shoes or steady bearings. The balls shall be alloy steel and shall bear vertically and horizontally on four (4) renewable special hardened (38-42 Rockwell C) steel liner strips force fitted (pins or cap screws not permitted) into the turntable base and internal gear. The liner strips shall be 3/8" thick x 3/4" wide. The internal gear, pinion, and ball race shall run in an oil bath and be protected by a felt seal and steel dust shield.
- L. The turntable base shall be bolted to the center column and be designed to support the internal gear with the rotating mechanism and the access bridge. An oil filling and level pipe along with a drain plug and sight gauge shall be furnished as part of this unit. A pipe shall be attached to the bottom of the turntable base for purposes of condensate removal. The oil piping shall terminate within the center of the base for easy access.
- M. The turntable assembly shall be so designed that the split internal gear, balls and strip liners may be removed without raising the access bridge.
- N. The drive mechanism shall be designed in accordance with AGMA Sections 2001-C-95, "Fundamental Rating Factors and Calculation Methods for Involute Spur and Helical Gear Teeth", and 6034-B92 "Practice for Enclosed Cylindrical Worm Gear Speed Reducers and Gearmotors"; for 24 hour continuous duty and 20 year design gear life, based on the AGMA rated torque. All bearings shall be designed for a minimum B-10 life of 200,000 hours.

2.06 CENTER PIER

- A. A cylindrical steel center pier shall support the drive, collector mechanism, and access bridge. The top of the pier shall have a drive mechanism mounting plate, which shall be set plumb with the centerline. The drive mechanism shall be positioned, shimmed, leveled, and grouted in place with a non-shrink grout. The center pier shall be fabricated of 1/4" thick steel plate. The center pier shall serve as an influent pipe and shall have a minimum of four (4) large inlet areas at its upper end to diffuse flow into the influent well. Included in the pier is a RAS line requiring a field weld at the top and a coupling at the existing pipe, conveying sludge to the existing pipe.
- B. The pier will be anchored to the concrete base with a minimum of eight (8) 1" diameter drill in epoxy adhesive anchors. The USFilter shall provide a steel template to accurately locate these anchor bolts. The center pier anchors will be designed to meet the current seismic loadings.

2.07 INFLUENT FEED WELL

- A. The influent well shall be fabricated of 1/4" steel plate sections with bolted connections and 1/4" structural steel trim angles top and bottom for shape and rigidity. The well is of adequate

size to diffuse the flow into the tank at a uniform flow through velocity not to exceed 0.05 fps at maximum flow. Ports shall be cut into the influent well to permit the escape of entrapped scum. Ports shall be baffled to prevent short circuiting to the effluent weir. The well shall be supported from the cage.

2.08 FEDWA ENERGY DISSIPATING BAFFLE SYSTEM

- A. Within the influent well there shall be a baffled arrangement to promote effective mixing and tapered flocculation. Flow exiting the center pier shall impinge in a succession of three (3) overlapping vertical target baffles with a series of four (4) increasing port areas. Horizontal shelf baffles shall prevent downward movement in the flocculation zone. Baffles shall bolt to the center cage and sludge well structure. Baffles shall be fabricated of 1/4" thick carbon steel plate sections with field located bolted connections.

2.09 HEADER

- A. The Unitube header, of a rectangular-shaped full tapered section, shall vary in size from a maximum near the tank center to a minimum at the outer end to provide uniform sludge draw-off velocities throughout and it shall be fabricated of 3/16" thick 304L stainless steel plate.
- B. The longitudinal cross sectional axis of the header shall be mounted at an angle of 45 degrees with the tank bottom to physically trap sludge for maximum solids concentration. The bottom edge of the header shall extend downward 2" to provide a fluidizing vane as an integral part of the header and to direct the sludge into the area of influence of the orifices with minimum sludge agitation. Attached to this vane shall be a neoprene squeegee with a minimum thickness of 1/4". The squeegee shall have slotted holes for 1" vertical adjustment. At the inner end of the header, a flange shall be provided for bolting to the sludge riser duct. The header shall have a center scraper of 1/4" steel plate with a neoprene blade to clean the tank bottom around the center column, directing the sludge to the first orifice.
- C. At regular intervals, not to exceed 30", inlet orifices varying in size from a minimum diameter near the tank center to a maximum at the outer end, shall be accurately located in the header.
- D. The design of each orifice shall be proportionate to the volume of sludge withdrawn and the design of the orifices and header shall be such as to insure hydraulic balance in the tank and uniform sludge withdrawal from the entire tank bottom at all flows. Alternate manufacturers shall submit verification data in accordance with the Substitute Equipment section of this specification.
- E. Control of sludge withdrawal shall be at the sludge collection box, and consist of a single operation for each basin.

2.10 HEADER SUPPORT

- A. The header support shall be tie bar with stainless steel turnbuckles.

2.11 CENTER CAGE, TRUSS & SLUDGE WELL

- A. The center cage shall be of an all-welded construction made up of structural steel members having a minimum thickness of 1/4".
- B. The sludge collection box shall consist of a rotating section separated from the stationary center pier by a neoprene seal. The stationary pier section shall be mounted within the top section of the center column above the influent discharge, and welded to the center column. The stationary section shall be provided with connection to a 14" diameter return sludge discharge pipe, which shall be mounted vertically within and concentric to the center column connecting to an existing sludge return line. The rotating section shall be supported by the center cage. The sludge riser duct shall terminate within the rotating section.
- C. Opposite the Unitube header, a truss sludge scraper arm shall be provided, supported from

the center cage and used for the skimmer support. The arm shall require no tie-bars for support, and shall be all-welded construction of members having a minimum thickness of 1/4".

2.12 ACCESS BRIDGE, HAND-RAILING & TOE PLATE

- A. An all-welded structural steel access bridge, of wide flange beam construction, shall extend from the tank wall to the stationary drive base. A bridge extension shall be provided for access to the drive. The bridge shall be designed to support, in addition to the dead load, a live load of 150# per lineal foot, with a deflection not exceeding 1/360 of the span. A 3' wide walkway, with 1-1/4" x 3/16" aluminum grating, shall extend over the entire bridge length. A center platform will be provided around the center drive unit. A double handrail, consisting of not less than 1-1/2" diameter, schedule 40 aluminum pipe for the rails and vertical posts, and a 3/16" thick x 4" high aluminum toe plate, shall be furnished for both sides of the walkway.
- B. The bridge will be complete with steel supports to be mounted to the existing weir wall and will extend over to the existing RAS well. Steps required for access to bridge are by others.

2.13 SURFACE SKIMMER, SCUM TROUGH AND SKIMMER BLADE RAMP

- A. One (1) 'full surface' surface skimmer shall be furnished consisting of radial scum blade supported from the influent well and structural "A" frames mounted on top of the truss arms. A pivoting wiper assembly shall be mounted on the outer end of the scum blade to form a pocket for trapping the scum. The mechanism shall insure continual contact and proper alignment between wiper blade, scum baffle and beach as the blade travels up the beach. The wiper blade shall have a wearing strip on its outer end, which contacts the scum baffle and a neoprene strip on its lower and inner edge. The scum shall be trapped as the wiper blade meets the skimmer blade ramp and is raised up the beach to be dumped into the scum trough. All springs, pivot points and threaded fasteners shall be constructed of 18-8 stainless steel.
- B. The scum trough and beach shall be fabricated of 1/4" thick steel plate, adequately supported from the tank wall. The scum trough shall be 4'-0" wide, with a length of 4'-9" along the tank wall. A 6" standard pipe flange shall be provided for connection to the scum discharge piping provided by others. A 6" diameter cored hole is required and is not included by USFilter.

2.14 ELECTRICAL CONTROLS

- A. A stainless steel control panel, mounted to the handrail near the drive unit, will be furnished complete with disconnect switch, shut down interlock and additional contacts for alarm/shut off points. Motor starters are located at the MCC.

PART 3 - EXECUTION

3.01 ACCEPTANCE TEST

- A. The sludge collector mechanism shall be field tested, after erection, and in the presence of the Engineer to confirm and verify the structural and mechanical compliance to the torque requirements specified by loading each collector mechanism with 100% and 120% of AGMA rated torque specified. This field test shall include checking the operation of warning and drive shutdown circuitry.
- B. All labor, materials, and test apparatus necessary for conducting the above tests shall be furnished by the Contractor at no additional cost to the Owner.

3.02 GENERAL ITEMS

- A. All equipment drill in anchors shall be 316 stainless steel, furnished by the USFilter, and of ample size and strength for the purpose intended. All anchors shall be set by the General Contractor in accordance with the Manufacturer's instructions.

3.03 MECHANISM FINISH COATING

- A. All carbon steel components will be seal welded, welds to be ground to minimize projection. edges of steel shapes will be broken with one pass of a grinder to insure paint adherence. Non submerged components to be blast cleaned per SSPC-SP6 and submerged items to be blast cleaned per SSPC-SP10. All carbon steel components shall receive one (1) shop coat of Sherwin Williams B67 Series Dura Plate 235 Epoxy red primer, 4 to 8 mils DFT, and one (1) shop finish coat of Sherwin Williams B67 Series Dura Plate 235 Black Epoxy, 4 to 8 mils DFT. Touch up of damage due to shipment and erection is by CONTRACTOR.

3.04 SERVICE

- A. Included is the service of the USFilter's field service technician for a period of two (2) trips and two (2) days.
- B. This service shall be for the purpose of check-out, initial start-up, acceptance testing, certification, and instruction of plant personnel.
- C. A written report covering the technician's findings and installation approval shall be submitted to the Engineer covering all inspections and outlining in detail any deficiencies noted.

END OF SECTION

SECTION 11371

POSITIVE DISPLACEMENT BLOWERS

PART 1 - GENERAL

1.01 SCOPE

- A. Provide two (2) complete skid mounted aeration system blower packages.

1.02 SUBMITTALS

A. Shop Drawings

1. Submit shop drawings. Submittal shall contain, as a minimum:
 - a. Product, performance and dimensional data.
 - b. Electrical connections, specifications.
 - c. Installation instructions.
 - d. System accessories.
 - e. Completed motor specification sheet.

B. Operation & Maintenance Data

1. Submit.
2. Complete data sheets.
3. Include operational, maintenance (with troubleshooting procedures) and installation data, replacement part numbers, electrical control diagrams, and any other material required.

1.03 START-UP

- A. Trip Report, Certificate of Proper Installation and Certificate of Contract Conformance required prior to final acceptance by OWNER.

PART 2 - PRODUCTS

2.01 MANUFACTURER

- A. Blowers shall be MD Pneumatics from Hardy Systems.

2.02 PERFORMANCE

A. Site Conditions

1. Elevation 800-feet USGS
2. Ambient Pressure 14.7 PSIA
3. Ambient Temperature 95°F
4. Relative Humidity 36%

B. Blower Criteria

	001 Blower	Mini System Blower
Inlet Air Temperature	95° F	95° F
Inlet Free Air Capacity	1900 ICFM	1900 ICFM
Pressure Differential	7.0 PSIG	6.75 PSIG
Discharge Pressure	21.7 PSIA	21.7 PSIA
Motor Speed	1,800 rpm	1,800 rpm
Motor	100 HP	100 HP

2.03 BLOWER CONSTRUCTION

A. Positive Displacement

B. Rotary Lobe

C. Casing

1. High strength, close grained, cast iron.
2. Vertical or horizontal arrangement.
3. Integral cast iron drive end plate.
4. Cast iron gear end plate.
5. Replaceable seal wear inserts provided for drive and gear end plates.

D. Rotor Assemblies

1. One piece, high strength, close grained spheroidal graphite ductile iron.
2. Replaceable seal ring wear sleeves.
3. Statically and dynamically balanced.

E. Timing Gears

1. Case hardened, ground alloy steel.
2. Straight cut and beveled to eliminate axial loads.
3. Timing gear sets shall be matched and assembled to optimize high speed performance.
4. Taper mount timing gear sets on rotors, in lieu of keyed hub mounting or taper pinned mounting.

F. Bearings

1. Heavy duty cylindrical roller bearings at all four shaft support locations, designed for radial loads.
2. 74,000 hour minimum L-10 design life at blower's maximum speed and pressure.

G. Lubrication

1. Oil splash gear and drive ends.

H. Seals

1. Four (4) piston type labyrinth seals at each end of each rotor.
2. Threaded vent ports of the cavity between the air side and oil side of the seals.
3. Threaded ports to allow purging of oil or contaminant.
4. Adequate ports provided to ensure that the cavity is vented from the bottom regardless of vertical or horizontal orientation.
5. One vent cavity shall be provided for each of four (4) seals, and closed with threaded metal plugs. Two (2) additional vent seals on the bottom of the blower shall remain open.
6. High temperature radial lip type input drive shaft seal with Viton elastomers and replaceable wear ring sleeve.

2.04 ELECTRIC MOTORS

- A. Motors shall be designed, manufactured, and tested in conformance with IEEE, ASA, NEC, IEC and NEMA MG-1 standards and requirements.
- B. The connected load shall not exceed the motor's nameplate horsepower rating exclusive of service factor, at design conditions.
- C. The blower motors shall conform to the following:

	001 Blower	Mini Blower
Number Required:	Two (2)	One (1)
Motor Type:	Horizontal AC Induction	Horizontal AC Induction
Power Requirements:	460 volt, 3 phase, 60 Hz	460 volt, 3 phase, 60 Hz
Horsepower:	100 HP	100 HP
Speed:	1800 RPM	1800 RPM
Duty Cycle:	Inverter	Inverter
Service Factor:	1:15	1:15
Insulation:	Class F, with Class B temperature rise	Class F, with Class B temperature rise
Enclosure:	TEFC	TEFC
Standard Design:	NEMA "B"	NEMA "B"
Locked Rotor Current:	NEMA Code "G"	NEMA Code "G"
Operating Voltage:	460 volts	460 volts

2.05 BLOWER SKID PACKAGE

- A. Each skid shall be furnished with the following:
 - 1 - 6016 MD Blower, or equal
 - 1 - Common Base
 - 1 - V-Belt Drive
 - 1 - Enclosed Drive Guard
 - 1 - Pressure Relief Valve, 2-inch weighted type
 - 1 - 100-HP TEFC, 3/60/230-460-V, Motor (VFD ready)
 - 1 - Slide Base
 - 1 - Mounting on a Common Base
 - 1 - Inlet Filter-Silencer
 - 1 - Blower Flexible Connector
 - 1 - Discharge Silencer
 - 1 - Discharge Pressure Gauge
 - 1 - Discharge Temperature Gauge
 - 1 - Item of Blower Oil

- 1 - Set of Vibration Pads
- 1 - Check Valve, Techno 5002
- 1 - Butterfly Valve, Keystone ARI, or equal
- 1 - Discharge Flexible Connector

2.06 INSULATION

- A. The skid mounted blower systems shall include blower intake piping insulation. Insulation may be factory or field installed and include all intake piping up to the blower inlet expansion joint. Insulation shall cover all fittings and the intake silencer.
- B. Insulation shall be ¾-inch Armstrong, Armaflex AP-2000, Armaflex II sheet insulation, or equal. Insulation shall be flexible, closed cell elastomeric thermal insulation, black in color. Fittings shall be neatly mitered using insulation material. Seal seams and butt joints with Armstrong 520 adhesive.

PART 3 - EXECUTION

Not Applicable.

END OF SECTION

ELECTRIC MOTOR DATA SHEET

TO BE COMPLETED BY CONTRACTOR AND SUBMITTED WITH EQUIPMENT SUBMITTALS

ITEM No.	
TYPE: <input type="checkbox"/> Induction <input type="checkbox"/> Synchronous <input type="checkbox"/> Other:	
HORSEPOWER:	FLA _____ LRA _____ Number Of Phases: <input type="checkbox"/> 1 <input type="checkbox"/> 3
VOLTAGE:	<input type="checkbox"/> 120 <input type="checkbox"/> 208/230 <input type="checkbox"/> 200/230/460 <input type="checkbox"/> 2400 <input type="checkbox"/> 4160
MIN. EFFICIENCY:	50% Load _____ 75% Load _____ 100% Load _____ <input type="checkbox"/> EPACT <input type="checkbox"/> NEMA Premium
POWER FACTOR:	50% Load _____ 75% Load _____ 100% Load _____
TORQUE CURVE:	NEMA Design <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D Full Torque: _____ Locked Torque: _____ Breakdown Torque: _____
INSULATION CLASS:	<input type="checkbox"/> B <input type="checkbox"/> F <input type="checkbox"/> H
SERVICE FACTOR:	MOUNTING: <input type="checkbox"/> Horizontal <input type="checkbox"/> Vertical
CODE LETTER:	
HEAT RISE:	(If Applicable) _____ C Above 40°C Ambient By
BEARING:	<input type="checkbox"/> Double Sealed/Shielded Bearing <input type="checkbox"/> Sleeve Type With Pressure Lubrication <input type="checkbox"/> Ring Oiled Sleeve Bearings With Oil Level Sight Glasses & Constant Level Sight Oil <input type="checkbox"/> Other: _____
Bearing Sizes: DE: _____ ODE: _____	
SPACE HEATERS:	<input type="checkbox"/> Required <input type="checkbox"/> 120 Volt <input type="checkbox"/> Other _____ <input type="checkbox"/> Not Required
ENCLOSURE:	<input type="checkbox"/> TEFC <input type="checkbox"/> TENV <input type="checkbox"/> ODP <input type="checkbox"/> Explosion-Proof <input type="checkbox"/> Severe/Harsh Duty <input type="checkbox"/> Other: _____
AREA CLASSIFICATION:	<input type="checkbox"/> Non-Classified <input type="checkbox"/> Class I <input type="checkbox"/> Class II <input type="checkbox"/> Division 1 <input type="checkbox"/> Division 2 Groups: _____
WINDINGS:	<input type="checkbox"/> Random Wound <input type="checkbox"/> Form Wound
STATOR TEMPERATURE SENSOR:	<input type="checkbox"/> Temperature Switch <input type="checkbox"/> RTD <input type="checkbox"/> None
NAMEPLATE RPM: _____	
DIRECTION OF ROTATION: (Fan End)	<input type="checkbox"/> CW <input type="checkbox"/> CCW <input type="checkbox"/> Both
TERMINAL BOX SIZE:	<input type="checkbox"/> Standard <input type="checkbox"/> Oversized
MOTOR FAN:	<input type="checkbox"/> Metal <input type="checkbox"/> Standard Country Of Origin: _____
VFD MOTORS:	Constant Torque Speed Range: _____:1 Variable Torque Speed Range: _____:1 Meets NEMA MG1, Part 31: <input type="checkbox"/> Yes <input type="checkbox"/> No
MANUFACTURER:	MODEL NO.

McMAHON ASSOCIATES, INC.

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Valparaiso, IN 46383
(219) 462-7743 - Telephone
(219) 464-8248 - Fax

1445 McMahon Drive / Neenah, WI 54956
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(815) 636-9591 - Fax

SECTION 11380**EPDM FLEXIBLE MEMBRANE DIFFUSER SYSTEM
- AERATION BASIN #2 -****PART 1 - GENERAL****1.01 SCOPE OF WORK**

- A. This section includes the design, manufacture, installation and start-up of a flexible membrane, fine pore aeration system, including in-basin aeration components, as shown on the drawings and as specified herein.

1.02 DEFINITIONS

- A. Tank: Vertical walled reactor within which aeration occurs.
- B. Diffuser Unit: Fabricated unit including diffuser support frame and flexible membrane which releases air to the water.
- C. Diffuser Assembly: Fabricated assembly including two (2) diffuser units and assembly mounting components.
- D. Air Drop Pipe: Vertical piping section from out-of-basin header stub to in-basin aeration system.
- E. Air Manifold Piping: Air distribution piping from drop pipe to air distribution headers.
- F. Air Header Distribution Piping: Air distribution piping from air manifold and diffuser assemblies.
- G. Air Header Piping: Out-of-basin air distribution piping from the blower building to the header stubs.
- H. Blower Manifold Piping: Air distribution piping between the blower discharge and air header piping.
- I. Aeration Grid: Associated piping and diffuser components connected to a single drop pipe.
- J. Standard Cubic Feet Per Minute (scfm): Air at 68°F, 14.7 psia and 36% relative humidity.
- K. Maximum Pressure: Pressure in blower manifold piping at the specified airflow rate.
- L. Oxygen Transfer Efficiency: Percent of oxygen in the air stream that is dissolved to the wastewater under specified conditions of temperature, barometric pressure, airflow rate, and dissolved oxygen concentration.
- M. Standard Oxygen Transfer Efficiency: Percent of oxygen in the air stream that is dissolved to clean water under conditions of 68°F, 14.7 psia, and zero dissolved oxygen.
- N. Air Distribution Uniformity: Variation in air distribution between diffuser assemblies.

1.03 SYSTEM DESCRIPTION

- A. Design Requirements:
 - 1. Design in-basin air piping and diffusers to diffuse air throughout the aeration tank(s) in accordance with the specifications.

2. Design each diffuser assembly to provide uniform air release over the specified airflow range.
3. Design the aeration system to provide the minimum specified oxygen transfer efficiency at the specified airflow and operating pressure.

1.04 SUBMITTALS

A. General:

1. A detailed engineering submittal package shall be provided in sufficient detail and scope to confirm compliance with the requirements of this section. Submittals shall be complete for all required components. Partial submittals will not be accepted.

B. Shop Drawings:

1. Detailed layout drawings for in-basin aeration components. Layout drawings shall include:
 - a. Layout and configuration of aeration system.
 - b. Detail drawings of diffuser assemblies showing components, method of construction, and attachment mechanism to air header distribution piping.
 - c. Detail drawings of all piping connections including drop to manifold, manifold to header and inline connections for manifold and headers.
 - d. Detail drawings of pipe support components.

C. Product Data:

1. Detailed listing of materials and materials of construction.
2. Product literature.

D. System Design & Performance Data:

1. Certified Oxygen Transfer Performance Curve:
 - a. Certified curve shall be an oxygen transfer efficiency in percent versus air fluxrate defined as scfm per active diffuser surface area in tap water at 14.7 psia, 20°C and zero dissolved oxygen at the specified submergence.
 - b. The certified curve shall be based on aeration test results from a full-scale test facility. Minimum acceptable tank size is 200 square feet with a maximum length to width ratio of 3.5.
 - c. Certified curve results shall be prepared and sealed by a Professional Engineer.
2. Include complete air headloss calculations for the aeration equipment from the top of the dropleg to the farthest diffuser bubble release point.
3. Design calculations showing uniform air distribution (+10% maximum variation) through lateral piping and diffuser element orifice system.
4. Design calculations for piping and support components.

5. Quality Assurance Testing:

- a. The membrane diffuser shall be sampled and tested for air distribution uniformity, dynamic wet pressure and dimensional tolerances.
- b. Test samples shall be selected from the membrane lots to be used on the project. A minimum of 1% random samples shall be selected from each lot.
- c. Sampling and testing shall be conducted in the supplier's shop.
- d. Dynamic wet pressure and dimensional tolerance test samples shall be drawn from the sample lot selected for uniformity testing.
- e. Test diffuser elements for dynamic wet pressure by submerging a diffuser unit at least two inches in tap water and operate at an air rate of 5 scfm per square foot $\pm 10\%$. DWP values shall be within $\pm 10\%$ of average value. DWP is defined as the pressure to operate at the specified conditions minus submergence and flow control losses.
- f. Dimensional Tolerances:
 - 1) Membrane Thickness: 2 mm ± 0.2 mm.
 - 2) Membrane Inside Diameter: 91 mm ± 1.0 mm (sludge tank, 117 mm ± 1.0 mm EQ tank).
 - 3) Membrane Length: 1000 mm ± 5 mm (sludge tank, 1359 mm ± 5 mm EQ tank).

6. Endurance Testing:

- a. Certified endurance test data shall be supplied for the diffuser units proposed in accordance with the following test conditions:
 - 1) Operate diffuser unit while submerged 12-inches in clean water through at least 1-million cycles on/off shall be supplied.
 - 2) Cycles shall be at least 10-second duration.
 - 3) Membranes shall retain initial headloss, dimensional tolerances, SOTE and visual characteristics.

7. Guarantee:

- a. All equipment and workmanship furnished under this contract shall be guaranteed to be free of defects in materials and workmanship for a period of 2-years from the date of shipment. Any such defects, which occur within the stipulated guaranty period, shall be repaired, replaced or made good at no cost to the OWNER.
- b. The guarantee shall include the capacity and integrated performance of the aeration components.

E. Installation Instructions:

1. Installation requirements and guidelines for all proposed equipment shall be provided.
2. Information on the aeration system shall include but not be limited to:
 - a. Diffuser unit assembly.
 - b. Diffuser assembly attachment.

- c. Piping components and assembly.
 - d. Piping support components.
 - 3. Information on the blower system shall include but not be limited to:
 - a. Blower skid mounting.
 - b. Inlet filtration and piping.
 - c. Ancillary components.
 - d. Motor wiring.
- F. Operation & Maintenance Data:
 - 1. Operations and maintenance data for all proposed equipment shall be provided.
 - 2. Information on the aeration system shall include but not be limited to:
 - a. Air flow balancing.
 - b. Diffuser assembly maintenance and membrane replacement.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Environmental Dynamics Inc., Columbia, Missouri.

2.02 MATERIALS

- A. Welded Stainless Steel Components:
 - 1. Sheets and plates of Type 304L stainless steel with 2D finish conforming to AISI 304L and ASTM A-240.
 - 2. Limit carbon content to 0.30% maximum.
- B. Non-welded Stainless Steel Components:
 - 1. Sheets and plates of Type 304 stainless steel conforming to AISI 304 and ASTM A-240.
- C. Fasteners & Anchorage Components:
 - 1. 18-8 series stainless steel.
- D. PVC Pipe & Fittings (Schedule 40 and 80):
 - 1. Base material shall be ASTM D-1784.
 - 2. Pipe shall be manufactured in accordance with ASTM D-1785 and ASTM D-2665.

2.03 AERATION EQUIPMENT

- A. System Performance:

1. The aeration-mixing system for the sludge storage tank shall be designed to meet the design brief in Attachment A of this specification.

B. Flexible Membrane, Fine Pore Diffusers:

1. The EDI FlexAir Magnum diffuser assembly shall be furnished and installed.
2. Each diffuser assembly shall be field assembled and include two (2) diffuser units and mounting saddle.
3. Diffusers unit shall have nominal dimensions of 3.5-inches in diameter and 40-inches long.
4. The diffuser membrane shall be fully supported over full length and circumference with a 3.5-inch PVC membrane support frame.
 - a. Use of a non-fully supported diffuser membrane is not acceptable.
5. The diffuser support frame shall be approximately 40-inches long and have a full diameter mounting connection.
 - a. Use of non-full diameter mechanical connections including threaded connections is not acceptable.
6. The diffuser membrane shall be held in place by two (2) 304 stainless clamps.
 - a. Retainer clamps shall be crimp type. Worm gear type clamps are not acceptable.
7. Installation of the diffuser membrane shall be accomplished with the removal and installation of the membrane clamps.
 - a. Disassembly of diffuser assembly to remove and install membranes is not acceptable.
8. Individual diffuser units shall be provided with an internal end cap.
9. The diffuser unit shall be fully capable of operating under continuous or intermittent conditions and shall be designed with check valve capabilities to prevent entry of mixed liquor into the diffuser unit or air piping on air shutdown or interruption of air supply. A minimum of three (3) check valve features shall be provided, not limited to the following:
 - a. Membrane shall be elastic and allow openings to close when the air supply is interrupted.
 - b. Membrane shall contract and close around full diameter support frame.
 - c. Membrane shall employ a non-perforated section that is aligned and seals against the support frame, air distribution orifices.
 - d. Use of independent or internal check valve components is not acceptable.
10. Diffuser assemblies shall be completely factory assembled with diffuser units, membranes and mounting saddle factory installed.
 - a. Field solvent welding or assembly of diffuser is not acceptable.
11. Diffuser assemblies shall be shipped to the jobsite assembled and properly crated and protected for shipment and handling.

12. Diffuser saddle mount shall be schedule 80 PVC construction and shall be capable of withstanding an external force of 4,800 inch-pounds without structural failure of the air distribution pipe, diffuser units connection or mounting saddle.
 - a. Small diameter threaded connections to attach diffusers to the air distribution header are not acceptable.
13. Saddle mount shall fully encompass the air distribution header and reinforce the pipe section at the diffuser assembly connection.
14. An O-ring gasket shall be provided to ensure an air-tight seal between the mounting saddle and air header.
15. A minimum 3-inch diameter connection shall be provided between the saddle mount and diffuser assembly.
16. The diffuser assembly shall mount below the air distribution header piping and provide full evacuation of entrapped water from the header through the diffuser assemblies.
 - a. Systems not that do not automatically purge entrapped water are not acceptable.

C. Flexible Membrane:

1. Membrane material for the diffuser unit shall be EPDM rubber.
 - a. Alternate membrane materials are not acceptable.
2. Membrane shall be extruded in a single piece with the following characteristics.
 - a. Membrane shall be 94 mm inside diameter with an overall length of 1,000 mm (sludge tank); 117 mm inside diameter with an overall length of 1,359 mm (EQ tank).
 - b. Perforated length on diffuser membrane shall be 924 mm (sludge tank), 1,308 mm (EQ tank).
 - c. Membrane shall be perforated on the top half of the sleeve.
 - d. Non-perforated membrane section shall be provided to seal off air distribution orifices on the diffuser support structure.
3. The following minimum material specifications shall be acceptable.
 - a. Base Polymer = EPDM
 - b. Tensile Strength, psi (ASTM D-412-92) = 1,850 minimum.
 - c. Tear Strength, Die T, pli (ASTM D-624-91) = 65 minimum.
 - d. UV Resistance = Carbon Black.
 - e. Ozone Resistance (ASTM D-471-95) = Non Cracking.
 - f. Ultimate Elongation (ASTM D-412-92) = 650 minimum.

D. Aeration System Piping:

1. Out-of-basin air piping including blower manifold, air header and header stubs are required and are to be supplied by the CONTRACTOR.

- a. Header stubs shall extend to the inside top of the wall and terminate with a full diameter, vertical face, flange.
 - b. Out-of-basin piping may be unlined ductile iron, galvanized steel, stainless steel or painted carbon steel.
 - c. The CONTRACTOR shall provide an isolating/balancing valve for control and distribution of air to the aeration grid and to allow isolating of the grid for inspection and maintenance on the header stub.
 - d. Isolation/balancing valve shall be positioned for accessibility from the top of the tank.
2. Drop pipe shall be provided with a flanged top connection and plain end.
- a. Drop pipe shall extend from the top connection to within 2-feet of the air manifold.
 - b. Material of construction for the drop pipe shall be Schedule 5, stainless steel.
 - c. Drop pipe shall connect to air manifold piping by means of a wrap-around clamp adapter.
3. All submerged manifolds and header components shall be Schedule 40 PVC minimum.
- a. Use of PVC piping shall only be employed when diffuser mounting system reinforces pipe wall at each mounting location.
 - b. Use of non-reinforced diffuser connections including threaded diffuser mounts is not acceptable.
4. Pipe supports shall be all stainless steel construction.
- a. Supports shall accommodate longitudinal movement in the piping components due to the thermal expansion and contraction over a temperature range of 100°F.
 - b. Supports shall restrain the axial and rotational movement of the pipe while providing for unrestrained longitudinal movement.
 - c. Supports shall allow leveling of the air piping with 2-inch minimum vertical adjustment at each support.
 - d. Each pipe support shall be connected to basin floor by at least two (2) anchor bolts.
 - e. The integrated pipe support assembly shall be designed to withstand the associated uplift force of the piping and diffuser assemblies with a minimum design factor of safety equal to ten (10).

END OF SECTION

ATTACHMENT A

11380-9

FINE BUBBLE DESIGN BRIEF - FLEXAIR™ TUBE DIFFUSER**EDI™ FlexAir™ AERATION SYSTEM FOR AEROBIC TREATMENT****Environmental Dynamics, Inc.**

5601 Paris Road, Columbia, Missouri 65202

ph. 573-474-9456 fax 573-474-6988

email edi@wastewater.com http://www.wastewater.com

DB - Oconto Falls-Average**Date: June 19, 2006****Project:**

Oconto Falls Tissue

Oconto Falls, WI

Consulting Engineer:

McMahon Associates

Tom Vik, P.E.

DESIGN CALCULATIONS**English Units****Metric Units****(1) Type Waste and Process - Activated Sludge**

(2) Design Flow	0.00	MGD	0	m ³ /d
(3) BOD Raw Waste				
a) concentration	0	mg/L	0	mg/L
b) weight/d	0	lb/d	0	kg/d
(4) Primary Treatment (% BOD Removal)	0.0	%	0.0	%
(5) % BOD for biological process (100% - Item 4)	100.0	%	100.0	%
(6) ALPHA = Ratio of oxygen transfer in waste to transfer in tap water	0.50	Alpha	0.50	Alpha
BETA = Ratio of solubility of oxygen in wastewater to solubility in tap water	0.95	Beta	0.95	Beta
(7) Site Elevation	735	ft	224	m
(8) Operating ambient pressure, winter	14.34	psia	988.72	millibar
Operating ambient pressure, summer	14.34	psia	988.72	millibar
(9) Dissolved O ₂ level in the aeration basin	2.00	mg/L	2.00	mg/L
(10) Temperature of waste in aeration basin:				
Winter Temperature	94.1	°F	34.5	°C
Summer Temperature	94.1	°F	34.5	°C
(11) Design BOD removal	0.0	%	0.0	%
(12) Carbonaceous BOD to the aeration basin (Item 3b) x (Item 5)	0.0	lb/d	0.0	kg/d
(13) Oxygen per unit of carbonaceous BOD removed	0.00	lb/lb	0.00	kg/kg
(14) Carbonaceous oxygen requirements for aeration at field conditions (Item 11)x(Item 12)x(Item 13)	0.0	lb O ₂ /d	0.0	kg O ₂ /d
(15) Ammonia to aeration basin				
a) concentration	0.0	mg/L	0.0	mg/L
b) weight/d	0.0	lb/d	0.0	kg/d
(16) Oxygen requirements for ammonia (Item 15b) x (4.6#O ₂ /##NH ₄ -N)	0.0	lb O ₂ /d	0.0	kg O ₂ /d
(17) Total oxygen requirements, AOR (Item 14 + Item 16) / 24	150.6	lb O ₂ /h	68.3	kg O ₂ /h
(18) Air supply for each EDI FlexAir™ diffuser tube	12.45	scfm	21.16	sm ³ /h
			19.71	nm ³ /h

DB - Dconto Falls-Average				
(19) Active surface area per diffuser tube	366	in ²	2361	cm ²
(20) Air release depth of diffusers	11.25	ft	3.43	m
(21) Tank floor surface, area	936	ft ²	87	m ²
(22) % Oxygen transfer, SOTE	22.15	%	22.2	%
(23) lb oxygen per h per tube, SOR	2.86	lb O ₂ /h/unit	1.30	kg O ₂ /h/unit
(24) Winter surface saturation, C _{smf}	7.01	mg/L	7.01	mg/L
Summer surface saturation, C _{smf}	7.01	mg/L	7.01	mg/L
(25) Effective depth correction factor	0.40		0.40	
(26) Standard condition aerated O ₂ saturation in the tank, C* ₂₀ =9.09*(29.92+0.8828*Item 20*Item 26)/29.92	10.30	mg/L	10.30	mg/L
(27) Theta value=	1.024		1.024	
(28) AOR/SOR=ALPHA[BETA(C* ₂₀)(C _{smf} /9.09)(P _{site} /P _{sc})- (Item 9)](THETA) ^(Item 10-20) /(C* ₂₀)				
Winter AOR/SOR	0.367		0.367	
Summer AOR/SOR	0.367		0.367	
(29) Number of EDI FlexAir™ tubes required for oxygen demand (Item 17) / [(Item 23) x (Item 28)]	144	units	144	units
(30) Air requirements for oxygenation (Item 18) x (Item 29)	1788	scfm	3039	sm ³ /h
			2832	nm ³ /h
(31) Assumed Mixing Design Criteria (air requirements)	0.12	scfm/ft ²	2.19	
(32) Air requirements for mixing (Item 31) x (Item 21)	112	scfm	191	sm ³ /h
			178	nm ³ /h
(33) Number of tubes for mixing and/or proper distribution	144	units	144	units
(34) Airflow per tube (mixing only)	0.78	scfm per unit	1.32	sm ³ /h per uni
			1.23	nm ³ /h per uni
(35) Design diffuser air fluxrate based on oxygenation or mixing requirements, use the larger.	4.90	scfm per ft ²	89.6	sm ³ /h/m ²
			83.5	nm ³ /h/m ²
(36) Diffuser Density: AT/AD Ratio (Area of Tank/Area of Diffusers) [floor area/(# diffusers x active diffuser area)]	2.56		2.56	
(37) Estimated system operating pressure: (See Engineering Submittal Documents for final operating pressure estimates)				
(a) Static liquid head	11.25	ft	3.43	m
(b) Pressure loss at blower building and header	1.00	ft	0.30	m
(c) Pressure loss lateral piping	0.50	ft	0.15	m
(d) Pressure loss though FlexAir™ tube	1.50	ft	0.46	m
(f) Normal compressor operating pressure (a+b+c+d)	14.25	ft	4.34	m
(38) Normal operating pressure	6.18	psig	426.08	millibar
(39) Design over-pressure (Approximate)	0.50	psig	34.48	millibar
(40) Peak design pressure	6.68	psig	460.56	millibar

Notes:

Upgraded aeration system.

72 Model 84P - doubling of original quantity.

Average AOR = 3615 #/day

FINE BUBBLE DESIGN BRIEF - FLEXAIR™ TUBE DIFFUSER**EDI™ FlexAir™ AERATION SYSTEM FOR AEROBIC TREATMENT****Environmental Dynamics, Inc.**

5601 Paris Road, Columbia, Missouri 65202

ph. 573-474-9456 fax 573-474-6988

email edi@wastewater.com http://www.wastewater.com

DB - Oconto Falls-Peak**Date: June 19, 2006****Project:**

Oconto Falls Tissue

Oconto Falls, WI

Consulting Engineer:

McMahon Associates

Tom Vik, P.E.

DESIGN CALCULATIONS**English Units****Metric Units**

(1) Type Waste and Process - Activated Sludge				
(2) Design Flow	0.00	MGD	0	m ³ /d
(3) BOD Raw Waste	a) concentration	0	mg/L	0
	b) weight/d	0	lb/d	0
(4) Primary Treatment (% BOD Removal)	0.0	%	0.0	%
(5) % BOD for biological process (100% - Item 4)	100.0	%	100.0	%
(6) ALPHA = Ratio of oxygen transfer in waste to transfer in tap water	0.50	Alpha	0.50	Alpha
BETA = Ratio of solubility of oxygen in wastewater to solubility in tap water	0.95	Beta	0.95	Beta
(7) Site Elevation	735	ft	224	m
(8) Operating ambient pressure, winter	14.34	psia	988.72	millibar
Operating ambient pressure, summer	14.34	psia	988.72	millibar
(9) Dissolved O ₂ level in the aeration basin	2.00	mg/L	2.00	mg/L
(10) Temperature of waste in aeration basin:				
Winter Temperature	94.1	°F	34.5	°C
Summer Temperature	94.1	°F	34.5	°C
(11) Design BOD removal	0.0	%	0.0	%
(12) Carbonaceous BOD to the aeration basin (Item 3b) x (Item 5)	0.0	lb/d	0.0	kg/d
(13) Oxygen per unit of carbonaceous BOD removed	0.00	lb/lb	0.00	kg/kg
(14) Carbonaceous oxygen requirements for aeration at field conditions (Item 11)x(Item 12)x(Item 13)	0.0	lb O ₂ /d	0.0	kg O ₂ /d
(15) Ammonia to aeration basin	a) concentration	0.0	mg/L	0.0
	b) weight/d	0.0	lb/d	0.0
(16) Oxygen requirements for ammonia (Item 15b) x (4.6#O ₂ /#NH ₄ -N)	0.0	lb O ₂ /d	0.0	kg O ₂ /d
(17) Total oxygen requirements, AOR (Item 14 + Item 16) / 24	247.1	lb O ₂ /h	112.1	kg O ₂ /h
(18) Air supply for each EDI FlexAir™ diffuser tube	22.30	scfm	37.89	sm ³ /h
			35.31	nm ³ /h

DB - Oconto Falls-Peak				
(19) Active surface area per diffuser tube	366	in ²	2361	cm ²
(20) Air release depth of diffusers	11.25	ft	3.43	m
(21) Tank floor surface area	936	ft ²	87	m ²
(22) % Oxygen transfer, SOTE	20.30	%	20.3	%
(23) lb oxygen per h per tube, SOR	4.69	lb O ₂ /h/unit	2.13	kg O ₂ /h/unit
(24) Winter surface saturation, C _{smt}	7.01	mg/L	7.01	mg/L
Summer surface saturation, C _{smt}	7.01	mg/L	7.01	mg/L
(25) Effective depth correction factor	0.40		0.40	
(26) Standard condition aerated O ₂ saturation in the tank, C* ₂₀ =9.09*(29.92+0.8828*Item20*Item26)/29.92	10.30	mg/L	10.30	mg/L
(27) Theta value=	1.024		1.024	
(28) AOR/SOR=ALPHA[BETA(C* ₂₀)(C _{smt} /9.09)(P _{site} /P _{sc})- (Item 9)](THETA) ^(Item 10-20) /(C* ₂₀)				
Winter AOR/SOR	0.367		0.367	
Summer AOR/SOR	0.367		0.367	
(29) Number of EDI FlexAir™ tubes required for oxygen demand (Item 17) / [(Item 23) x (Item 28)]	144	units	144	units
(30) Air requirements for oxygenation (Item 18) x (Item 29)	3202	scfm	5440	sm ³ /h
			5069	nm ³ /h
(31) Assumed Mixing Design Criteria (air requirements)	0.12	scfm/ft ²	2.19	
(32) Air requirements for mixing (Item 31) x (Item 21)	112	scfm	191	sm ³ /h
			178	nm ³ /h
(33) Number of tubes for mixing and/or proper distribution	144	units	144	units
(34) Airflow per tube (mixing only)	0.78	scfm per unit	1.32	sm ³ /h per uni
			1.23	nm ³ /h per uni
(35) Design diffuser air fluxrate based on oxygenation or mixing requirements, use the larger.	8.77	scfm per ft ²	160.5	sm ³ /h/m ²
			149.5	nm ³ /h/m ²
(36) Diffuser Density: AT/AD Ratio (Area of Tank/Area of Diffusers) [floor area/(# diffusers x active diffuser area)]	2.56		2.56	
(37) Estimated system operating pressure: (See Engineering Submittal Documents for final operating pressure estimates)				
(a) Static liquid head	11.25	ft	3.43	m
(b) Pressure loss at blower building and header	1.00	ft	0.30	m
(c) Pressure loss lateral piping	0.50	ft	0.15	m
(d) Pressure loss though FlexAir™ tube	1.50	ft	0.46	m
(f) Normal compressor operating pressure (a+b+c+d)	14.25	ft	4.34	m
(38) Normal operating pressure	6.18	psig	426.08	millibar
(39) Design over-pressure (Approximate)	0.50	psig	34.48	millibar
(40) Peak design pressure	6.68	psig	460.56	millibar

Notes:

Upgraded aeration system.

72 Model 84P - doubling of original quantity.

Peak AOR = 5931 #/day

SECTION 11390

**FINE BUBBLE AERATION EQUIPMENT
- AERATION BASIN #1 -**

PART 1 - GENERAL

1.01 SCOPE

A. Description of Work

1. Provide all labor, material and equipment to furnish and install the fine bubble aeration system as shown on the contract drawings and as specified herein.

B. Work and Components Included

1. The Equipment Manufacturer shall furnish the items listed below:
 - a. Drop Pipe(s)
 - b. Manifold(s)
 - c. Distribution Header(s)
 - d. Fine Bubble Diffusers
 - e. Supports
 - f. Airlift Purge System(s)
2. Like items of equipment specified herein shall be the end products of one manufacturer in order to achieve standardization for operation, maintenance, spare parts and manufacturer's service.

C. Related Work Not Included

1. The following items are specified under other sections of these specifications:
 - a. Blowers – Division 11
 - b. Plant Piping, Valves, and Appurtenances – Division 15

1.02 SUBMITTALS

A. Shop Drawings

1. Shop drawings shall be submitted to the Engineer for approval. Shop drawings shall include dimensional layouts, materials, details of appurtenances, anchoring, installation, and operation instructions. Fabrication and installation shall be in accordance with approved drawings.
2. Certified diffuser performance test data shall be submitted. It shall include air flow versus headloss data, and Standard Oxygen Transfer Tests conducted in clean water in accordance with the latest Standard published by the ASCE Subcommittee on Oxygen Transfer Standards.
3. SOTE calculations to verify the clean water oxygen transfer efficiency of the diffuser at both design and maximum airflow.
4. Headloss Calculations for the complete aeration system shall start from the top of the drop leg and continue to the furthest diffuser. Calculations shall include the total headloss across the membrane, balancing orifice, piping system and static head at

both design and maximum airflow.

5. Six (6) copies of the manufacturer's operation, installation and maintenance manual shall be submitted for approval prior to shipment of the equipment.

1.03 DEFINITIONS

- A. SCFM: Standard cubic feet per minute is understood to be air at 68°F, 14.7 PSIA and 36% relative humidity flowing at a rate of 1 cubic feet per minute.
- B. SOTR: Standard oxygen transfer rate is understood to be the rate of oxygen transferred to tap water (pounds of oxygen per hour) at standard conditions of 20°C, 0.0 mg/l residual dissolved oxygen concentration, and a barometric pressure of 760 mm Hg (dry air).
- C. SOTE: Standard oxygen transfer efficiency is understood to be the percentage of oxygen transferred under standard conditions of 20°C, 0.0 mg/l residual dissolved oxygen concentration, and a barometric pressure of 760 mm Hg (dry air).
- D. SWD: Side water depth is understood to be the overall dimension from the high point of the basin floor to the water surface.

1.04 GUARANTEE & WARRANTY

- A. The equipment shall be guaranteed to meet or exceed the design criteria detailed in Part 2 of this specification.
- B. Manufacturer shall warrant that the complete system shall be free from defective material and workmanship for a period of one (1) year after final acceptance of the equipment.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. USFilter, Envirex Diffused Air Products of Waukesha, WI.

2.02 EQUIPMENT

A. Drop Pipe

1. A 304 L stainless steel upper drop pipe shall be provided for each aeration grid to a point approximately 2' above the manifold. The drop pipe shall start at the top of the basin with a flanged connection as shown on the contract drawings. Upper drop pipe shall have a minimum wall thickness of .109" and shall conform to ASTM A-774 & A-778.
2. A SCH 40 PVC lower drop pipe shall be provided from the upper drop pipe to the manifold. Lower drop pipe shall conform to ASTM D-1784 & D-1785. PVC piping with a wall thickness less than SCH 40 (0.237") shall not be acceptable.

B. Manifold

1. A SCH 40 PVC manifold shall be provided perpendicular to the distribution headers and as shown on the contract drawings. Manifold shall conform to ASTM D-1784 & D-1785. PVC piping with a wall thickness less than SCH 40 (0.237") shall not be acceptable.

C. Distribution Headers

1. SCH 40 PVC distribution headers shall be provided perpendicular to the manifold and as shown on the contract drawings. Distribution headers shall have a minimum size of 4" with an outside diameter of 4.5". Headers shall be fabricated in section

up to 20' in length and shall conform to ASTM D-1784 & D-1785. PVC piping with a wall thickness less than SCH 40 shall not be acceptable.

2. Maximum spacing between distribution headers shall be 8'-0".

D. Fine Bubble Diffuser Assemblies

1. Diffuser Holder

- a. The diffuser holder shall be molded of PVC as a dual unit. The dual unit shall contain two (2) diffuser membranes. The material used shall conform to ASTM-1784 and D-638 standard with a minimum tensile strength of 7000 psi. The holder shall be molded with threads to accept a retaining ring, with a minimum of 2½ threads of engagement to ensure a complete seal. This ring shall also be molded of PVC and shall be manufactured to apply equal pressure around the outer edge of the diffuser to hold it securely in place. The ring and holder shall each have a raised lip around the diffuser contact surface to insure a proper seal against the diffuser gasket.

2. Diffuser Membrane

- a. The diffuser membrane shall be EPDM rubber, specially compounded for use in wastewater. The membrane shall be designed with an integral seal ring around the outer periphery for compression between the diffuser base and the retaining ring. The center portion of the membrane shall have increased thickness for reinforcement. The membrane shall be perforated by a multitude of "I" - shaped slits lying in concentric circles of varying diameters.
- b. The membrane shall be 9" in diameter and have the following minimum characteristics:

Specific Gravity	1.15 ±0.1	
Ozone Resistance	Pass	ASTM D-1171
Durometer, Shore A	55 ± 3	ASTM D-2240
Tensile Strength	≥ 2000 PSI	ASTM D-412
Elongation at Break	≥ 650%	ASTM D-412
Max. Compression Set,	≤ 15% @ 70°C, 24hrs	ASTM D-573

3. Support Plate

- a. There shall be a molded polypropylene support plate inserted into the diffuser base for support of the membrane when the airflow is discontinued. The plate shall be reinforced with a minimum of six (6) gussets to prevent deformation from static head pressure. The plate shall support the full area of the membrane, except for a central opening allowing the air to pressurize the membrane.

4. Retaining Ring

- a. The retaining ring shall be molded of PVC and shall contain threads for attachment to the threads on the diffuser base. Upon tightening of the retaining ring, the membrane seal ring shall be compressed into the groove on the diffuser base to provide a positive seal. There shall be a minimum of 2½ threads of engagement to ensure a complete seal with the diffuser holder.

5. Diffuser Connection

- a. Each diffuser holder assembly shall be connected to the pipe by means of a mechanical attachment, such that any single damaged assembly may be replaced in the field without the need to replace piping or other assemblies.

Glued connections will not be acceptable.

- b. To eliminate the risk of rotation on the pipe during retaining ring installation or removal, each diffuser holder shall be attached to the pipe by means of at least two rivets. For maximum stability and strength, the diffuser holder shall contact the pipe over a minimum of 180 degrees of the pipe's circumference. Each pair of rivets shall be separated by no less than 100 degrees of arc about the pipe's circumference. The membranes, support plates and retaining rings shall be shipped separately for final assembly at the job site.
- c. Each rivet shall be hollow, forming an orifice having a $\frac{1}{4}$ " inside diameter and be fabricated from corrosion-resistant brass or stainless steel.
- d. Rivets shall be capable of forming an airtight seal at differential pressures of at least 5 PSIG pressure differential without requiring the use of a gasket or sealant.
- e. The diffuser holder, pipe and connection shall withstand 2,500,000 cycles at a 30 LB/Ft bending moment without air leakage of the connection or breakage of diffuser holder or pipe. Test data shall be submitted from a minimum of 3 test specimens validating diffuser holder, pipe and connection integrity. Failure to pass the specified integrity test shall result in the rejection of the complete system.

6. Operation

- a. Air shall enter through a $\frac{1}{4}$ " orifice in each diffuser holder rivet. The chamber in the diffuser holder shall then fill with air until sufficient back pressure is reached to push air through the membrane media, thereby producing fine bubble aeration.

E. Supports

1. Manifold & Drop Pipe Supports

- a. Manifold and drop pipe supports to be fabricated from 304 stainless steel. Each support shall have a support cradle with a minimum 2" wide bearing surface and shall be secured to the concrete bottom with two (2) 304 stainless steel threaded rods with a minimum diameter of $\frac{1}{2}$ ". Each rod will be anchored to the concrete by a chemical adhesive designed for long term wet base conditions. Maximum spacing between supports shall be 8'-0" center to center.

2. Distribution Header Supports

- a. Distribution header supports for sloped bottom tank to be fabricated from 304 stainless steel. Each support shall have a support cradle with a minimum 2" wide bearing surface and shall be secured to the concrete bottom with two (2) 304 stainless steel threaded rods with a minimum diameter of $\frac{1}{2}$ ". Each rod will be anchored to the concrete by a chemical adhesive designed for long term wet base conditions. Maximum spacing between supports shall be 8'-0" center to center. Maximum support spacing for header piping with a wall thickness less than SCH 40 (.237") shall be 4'-0" center to center.

F. Design

- 1. The system shall be designed for contraction/expansion over a temperature range of 120 °F without deforming any component. Fixed supports will anchor the header against movement and intermediate supports will allow for longitudinal movement. One fixed support shall be provided for each straight pipe run.

2. Fixed or expansion joints shall be provided as required.
3. Flanged joints shall Van Stone with through bolts. The flanged joints shall transmit the longitudinal forces caused by expansion and contraction of the air distribution header. All flanged joints shall have 45 to 55 Durometer, Shore A, neoprene gaskets.

G. Airlift Purge System

1. Each grid system shall be provided with one (1) airlift purge assembly. Each assembly shall be designed to remove excess moisture and shall consist of a ¾" eductor tube, 1" SCH 80 pipe and fittings, stainless steel wall clips with anchors and a bronze bodied ball valve with stainless steel ball.

2.03 PERFORMANCE REQUIREMENTS

- A. The minimum system requirements shall be per the following:

Basin Name: Aeration Basin

Plant Flow	MGD
AOR, lb/d	4,272 Avg., 6,840 Max.
SOR, lb/d	11,620 Avg., 17,017 Max.
Number of Tanks	One (1)
Dimensions	
Diameter	90 ft. diameter
Sidewater Depth	15
Average Air Supply (per tank)	1,675
Peak Air Supply (per tank)	2,605
Diffuser Quantity (per tank)	930
SOTE @ average airflow, %	27.62
SOTE @ peak airflow, %	26.00
Maximum allowable pressure drop (max airflow) (top of drop pipe), psig	6.9

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Prior to connecting the diffuser to the headers, the Contractor shall carefully clean all piping, headers, and accessories through which air is delivered, so that all dust, dirt, oil, grease, for other foreign material will be effectively removed from contact with the air being blown through the diffusers. This cleaning shall be done with air at velocity of 2,000 to 3,000 feet per minute. All diffusers shall be leveled to within 3/8 inch of a common horizontal plane.

3.02 FIELD TESTING

- A. After the piping, headers, and diffusers for any tank have been installed, clear water shall be introduced into the tank until the diffusers have been covered about 2 inches. Compressed air shall then be released through the piping and any leaks through joints, piping, and the like shall be repaired. This test shall be repeated until the entire system is tight, to the satisfaction of the Engineer. Testing will be done by the Contractor under the direction of the Engineer.
- B. By visual inspection, air release shall be shown to be uniform for each diffuser and header section.
- C. The Contractor shall make all modifications and repairs until the system passes all tests at no cost to the Owner.

3.03 FIELD SERVICE

- A. The manufacturer shall furnish the services of a competent representative experienced in the operation of the equipment to inspect the installation of his equipment and instruct the plant operating personnel in the proper operation and maintenance of the diffused air equipment. A total of () eight-hour days in () trips shall be provided. Contractor to coordinate field service with equipment manufacturer and engineer and shall provide at least two (2) weeks notice for scheduling purposes.

END OF SECTION

DIVISION 13 - SPECIAL CONSTRUCTION

Page 1

SECTION 13415 - DISSOLVED OXYGEN MONITORING SYSTEM

PART 1 - GENERAL

- 1.01 Scope Of Work.
- 1.02 Submittals.
- 1.03 Start-Up.

PART 2 - PRODUCTS

- 2.01 Manufacturer.
- 2.02 Equipment.
- 2.03 Sensor.
- 2.04 Transmitter.
- 2.05 Indicating Signal Converter.
- 2.06 Calibration.

PART 3 - EXECUTION

Not Applicable.

SECTION 13420 - MAGNETIC FLOW METERS

PART 1 - GENERAL

- 1.01 Scope Of Work.
- 1.02 Submittals.

PART 2 - PRODUCTS

- 2.01 Magnetic Flow Meter Flow Tubes.
- 2.02 Magnetic Flow Indicating Signal Converter / Transmitter.
- 2.03 Accessories.
- 2.04 Warranty.

PART 3 - EXECUTION

Not Applicable.

SECTION 13415

DISSOLVED OXYGEN MONITORING SYSTEM

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. Provide dissolved oxygen monitoring system with microprocessor based converter / transmitter.
- B. Sensor locations **as** shown on the drawings.
- C. Control blower output in response to dissolved oxygen levels / set-points.

1.02 SUBMITTALS

- A. Shop Drawings
 - 1. Submit shop drawings. Submittal shall contain, as a minimum, the following:
 - a. Product, performance and dimensional data.
 - b. Electrical connections, specifications.
 - c. Installation instructions.
 - d. System accessories.
- B. Operation & Maintenance Data
 - 1. Fill out data sheets.
 - 2. Include operational, maintenance (with trouble-shooting procedures) and installation data, replacement part numbers, electrical control diagrams and any other materials required.

1.03 START-UP

- A. Trip Report, Certificate Of Proper Installation and Certificate of Contract Conformance is required prior to final acceptance by OWNER.

PART 2 - PRODUCTS

2.01 MANUFACTURER

- A. Danfoss, Model OXY 4100 Transmitter, OXY 1100 Sensor, and USC 5000 Converter, or Environmental Instruments, Fluoroprobe, DO system.

2.02 EQUIPMENT

- A. Sensor and intrinsically safe transmitter enclosed in a 9.5-inch diameter ball float.
- B. Indicating signal converter.
- C. Handrail mounting bracket and accessories.
- D. Remote mounting kit.
- E. Integral Keypad, password protected, for programming.

- F. Provide one (1) set of spare parts.

2.03 SENSOR

- A. Clark or Polarographic operating principle.
- B. Gold cathode.
- C. Silver anode.
- D. Pre-stressed bonded Teflon diaphragm.
- E. Potassium chloride electrolyte.
- F. Sealed enclosure, inside transmitter.
- G. 32 to 122°F operating temperature.
- H. 2 to 3-year sensor life, replaceable without the use of tools or need for replacement chemicals.

2.04 TRANSMITTER

- A. Two-wire, intrinsically safe, integral enclosure.
- B. NEMA 6P, 9.5-inch diameter polystyrene ball float.
- C. 12 to 30 VDC power supply.
- D. -32 to 122°F operating temperature.

2.05 INDICATING SIGNAL CONVERTER

- A. 4-20 mA output into 750-ohms, maximum, proportional to ppm.
- B. NEMA 6P enclosure.
- C. Back-lit Alphanumeric LCD display.
- D. 0.5% accuracy.
- E. 0 to 0.1 ppm and 0 to 50 ppm range.
- F. -40 to 140°F operating range.
- G. 115 VAC, 11 to 30 VDC.

2.06 CALIBRATION

- A. Two (2) automatic calibration methods:
 - 2. Initiate by tilting transmitter.
 - 3. Initiate by pressing calibration button on converter keyboard.

PART 3 - EXECUTION

Not Applicable.

END OF SECTION

13415-2

SECTION 13420

MAGNETIC FLOW METERS

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. CONTRACTOR shall furnish and install magnetic flow meters and appurtenances complete, as specified in locations shown on the drawings.
- B. Manufacturer shall verify that liner material and electrodes will be suitable for the fluid being handled.

1.02 SUBMITTALS

- A. Shop Drawings:
 - 1. Submit shop drawings. Submittal shall contain, as a minimum, the following:
 - a. Product, performance and dimensional data.
 - b. Electrical connections, specifications.
 - c. Installation instructions.
 - d. System accessories.
- B. Operation & Maintenance Data:
 - 1. Fill out manufacturer's data sheets, indicating settings of all adjustable parameters.
 - 2. Include operational, maintenance (with trouble-shooting procedures) and installation data, replacement part numbers, electrical control diagrams and any other materials required.
- C. Start-Up:
 - 1. Trip Report, Certificate Of Proper Installation and Certificate Of Contract Conformance required prior to final acceptance by OWNER.

PART 2 - PRODUCTS

2.01 MAGNETIC FLOW METER FLOW TUBES

- A. Flange Types 6 through 72-inch Manufacturers: One of the following or equal:
 - 1. Siemens - Mag 5100W.
 - 2. Krohne - Enviromag.
- B. Flange Type Magnetic Flow Meter Element, 24-inches & Smaller: Obstructionless; in-line flow element with no constrictions in flow or fluid through meter, consisting of metallic tube with ANSI B16.5, Class 150, flanged ends for diameter and bolt drilling pattern.
- C. Flange Type Magnetic Flow Meter Element, Larger Than 24-inches: Obstructionless; in-line flow element with no constrictions in flow or fluid through meter, consisting of metallic tube with AWWA Class B, C or D flanged ends for diameter and bolt drilling pattern.

- D. Electrode & Liner Materials: Fully compatible with process fluid, complying with requirements of application.
 - 1. Wastewater Applications: Hard rubber.
- E. Safety Ground, Power Supply From Signal Converter: Grounding conductor connected to grounding lug internal to flow meter element control box.
- F. Power Supply & Safety Ground, Meters & Externally Mounted Signal Converter / Transmitters: Same.
- G. Meter Housing: Capable of standing empty for extended time intervals without damage to components with splash-proof and drip-proof meter housing.
- H. Service: Capable of servicing/replacing coils under pressure without taking line out of service.
- I. Ground Rings: Provide manufacturer's standard.
- J. Flow tube shall be certified for use in hazardous areas by a recognized authority, such as Factory Mutual.
- K. Flow Meter Tabulation:

Tag ID	Service	Size (inch)	Flow Range (gpm)	Transmitter: Integral or Remote
WAS-001		6"	100 to 1,000	Remote
RAS-Mini		6"	100 to 1,000	Remote
RAS-001		8"	500 to 1,500	Remote

2.02 MAGNETIC FLOW INDICATING SIGNAL CONVERTER / TRANSMITTER

- A. Type:
 - 1. Direct current, pulsed bipolar, with signal stability at zero flows.
 - 2. Microprocessor type with local flow rate indication and local flow totalization indicator, scaled in engineering units.
 - 3. With zero return units where specified or indicated on the drawings.
 - 4. Powered from signal converter power source.
 - 5. Produces 4-milliampere direct current signal during no flow conditions or programmable for low flow cut-off between 0.04 and 1.0-feet per second flow range.
- B. System Accuracy, Including Magnetic Flow Meter Transmitter & Signal Converter: Within 0.5% of actual flow rate for 10 to 100% full scale where velocity is between 1.0 and 30-feet per second.
- C. Cable Between Remote Converter (FIT) & Magnetic Flow Meter Elements: Manufacturer's standard.
- D. Housing: NEMA 4X, corrosion-resistant, weatherproof, operable in ambient -20 to +140°F temperature and 10 to 100% relative humidity.
- E. Signal Converter / Transmitter Output:
 - 1. Analog Output: Isolated 4020 milliamperes direct current.

2. Pulse Output: Able to operate remote totalizer scaled for minimum 60-days at 100% flow without repeating.
 3. Scale Factors: Field adjustable, selected to provide totalizer multiplier of power of 10.
- F. Zero Flow Stability: By Power driven electrode shielding or automatic zero adjustment of direct current excited metering circuit.
- G. Provide transmitter integral to flow tube or remote, as scheduled.

2.03 ACCESSORIES

- A. Furnish sufficient length of signal cable to interconnect the sensor to the remote mounted electronics (transmitter). Verify cable lengths required from drawings.
- B. Furnish one (1) set of any special tools and test equipment, including calibrator, required for repair and re-calibration of the flow meters.

2.04 WARRANTY

- A. Provide manufacturer's standard 1-year warranty.

PART 3 - EXECUTION

Not Applicable.

END OF SECTION

Attachments: Manufacturer Service Representative Trip Report
Manufacturer / Supplier Certificate Of Proper Installation
Manufacturer / Supplier Certificate Of Contract Conformance

DIVISION 15 - MECHANICAL

Page 1

SECTION 15060 - PIPING METHODS

PART 1 - GENERAL

- 1.01 Scope of Work.
- 1.02 Submittals.

PART 2 - PRODUCTS

- 2.01 Interior Pipe Placement.
- 2.02 Buried Pipe Placement.

PART 3 - EXECUTION

- 3.01 Pipe Testing.

SECTION 15062 - DUCTILE IRON PIPE

PART 1 - GENERAL

- 1.01 Scope of Work.
- 1.02 Submittals.

PART 2 - PRODUCTS

- 2.01 Flanged Pipe.
- 2.02 Mechanical Joint Pipe.
- 2.03 Push-On Joint Pipe.
- 2.04 Ball Joint Flexible Ductile Iron Pipe.
- 2.05 Pipe & Fittings Linings & Coatings.

PART 3 - EXECUTION

- Not Applicable.

SECTION 15064 - POLYVINYL CHLORIDE PIPE

PART 1 - GENERAL

- 1.01 Submittals.

PART 2 - PRODUCTS

- 2.01 Waste Vent & Drainage Piping.
- 2.02 Process Piping.
- 2.03 PVC Sewer Pipe & Fittings.
- 2.04 Pressure Pipe & Fittings.

PART 3 - EXECUTION

- Not Applicable.

SECTION 15066 - STAINLESS STEEL PIPE

PART 1 - GENERAL

- 1.01 Scope Of Work.
- 1.02 References.

PART 2 - PRODUCTS

- 2.01 Stainless Steel Pipe.
- 2.02 Stainless Steel Fittings.
- 2.03 Stainless Steel Flanged Connections.
- 2.04 Finish.
- 2.05 Supports.

PART 3 - EXECUTION

- 3.01 Welding.
- 3.02 Installation.

DIVISION 15 - MECHANICAL

Page 2

SECTION 15080 - PIPING SPECIALTIES

PART 1 - GENERAL

- 1.01 Submittals.

PART 2 - PRODUCTS

- 2.01 Sleeve Type Couplings.
- 2.02 Flange Adapters.
- 2.03 Flanged Flexible Couplings.
- 2.04 Cast Iron Wall Sleeves.
- 2.05 Pipe Sleeves.
- 2.06 Wall Pipe.

PART 3 - EXECUTION

Not Applicable.

SECTION 15092 - WALL SEALS

PART 1 - GENERAL

- 1.01 Submittals.

PART 2 - PRODUCTS

- 2.01 Design Criteria.

PART 3 - EXECUTION

Not Applicable.

SECTION 15093 - FLEXIBLE CONNECTORS

PART 1- GENERAL

- 1.01 Submittals.

PART 2 - PRODUCTS

- 2.01 Design Criteria.
- 2.02 Special Requirements.

PART 3 - EXECUTION

Not Applicable.

SECTION 15094 - FLEXIBLE CONNECTORS

PART 1 - GENERAL

- 1.01 Submittals.

PART 2 - PRODUCTS

- 2.01 Slip-On Elastomeric Coupling.
- 2.02 Flexible Connectors.

PART 3 - EXECUTION

Not Applicable.

SECTION 15101 - VALVE IDENTIFICATION TAGS

PART 1 - GENERAL

- 1.01 Submittals.

PART 2 - PRODUCTS

- 2.01 Design Criteria.

PART 3 - EXECUTION

Not Applicable.

DIVISION 15 - MECHANICAL

Page 3

SECTION 15103 - PLUG VALVES

PART 1 - GENERAL

- 1.01 Summary.
- 1.02 Submittals.

PART 2 - PRODUCTS

- 2.01 Manufacturers.
- 2.02 Design Criteria.

PART 3 - EXECUTION

Not Applicable.

SECTION 15104 - BUTTERFLY VALVES

PART 1 - GENERAL

- 1.01 Submittals.

PART 2 - PRODUCTS

- 2.01 Air Service.

PART 3 - EXECUTION

Not Applicable.

SECTION 15112 - IN-LINE CHECK VALVES

PART 1 - GENERAL

- 1.01 Submittals.

PART 2 - PRODUCTS

- 2.01 Design Criteria.

PART 3 - EXECUTION

Not Applicable.

SECTION 15140 - SUPPORTS & ANCHORS

PART 1 - GENERAL

- 1.01 Submittals.

PART 2 - PRODUCTS

- 2.01 Pipe Hangers & Supports.
- 2.02 Hanger Rods.
- 2.03 Inserts.
- 2.04 Equipment Pads.
- 2.05 Sleeves.
- 2.06 Fabrication.
- 2.07 Finish.

PART 3 - EXECUTION

- 3.01 Inserts.
- 3.02 Pipe Hangers & Supports.
- 3.03 Equipment Bases & Supports.
- 3.04 Flashing.
- 3.05 Sleeves.

SECTION 15060**PIPING METHODS****PART 1 - GENERAL****1.01 SCOPE OF WORK**

- A. The following specifications cover all interior, exterior or buried piping. The items listed are those generally used in connection with the construction of water works and wastewater treatment or conveyance projects. It is likely that not all items will be used on this particular project. The CONTRACTOR shall check the drawings and all sections of the specifications for items required.
- B. All pipe is to be furnished by the CONTRACTOR, complete with all fittings and accessories, and ready for use. All gaskets, bolts, supports, couplings, wall sleeves, sleeves, hangers, anchors, seals, wedges and other special ties necessary to complete the work shall be provided and considered incidental to the work.
- C. The following specifications shall be considered applicable to all pipe materials to be constructed in interior or exposed exterior locations and in buried locations unless otherwise specified or detailed on the drawings.

1.02 SUBMITTALS

- A. Shop Drawings
 - 1. Submit shop drawings.

PART 2 - PRODUCTS**2.01 INTERIOR PIPE PLACEMENT**

- A. The CONTRACTOR shall furnish a complete system of pipe supports, provide expansion joints and anchor all piping. The pipe support system shall be installed complete with all necessary inserts, bolts, nuts, rods, washers, miscellaneous steel, and other accessories. In some instances, pipe supports, anchors, and expansion joints have been shown on the drawings, but no attempt has been made to indicate every pipe support, anchor, and expansion joint for piping included under this portion of the specifications. Portions of the piping are shown on the detail drawings. Some of the piping, however, is shown only on the schematics.
- B. All piping exposed in interior locations shall be adequately blocked, anchored or harnessed to resist thrust due to change in pipe diameter or direction or at pipe dead ends to prevent separation of joints.
- C. For suspended piping, anchors shall be centered as closely as possible between expansion joints and between elbows and expansion joints. Anchors shall hold the pipe securely and shall be sufficiently rigid to force expansion and contraction movement to take place at expansion joints and elbows.
- D. All piping work shall be done in accordance with the arrangements shown on the drawings. The runs of piping are, in part, diagrammatic and the CONTRACTOR shall, without extra cost, run the piping as directed by the ENGINEER/ARCHITECT at the time of installation, so as to best fit the conditions in the building, and so that no piping shall pass through beams or other structural members in such a way as to impair their strength.

- E. Special care shall be exercised to keep all piping in the buildings in locations as shown on the drawings and to install the risers and horizontal runs so as to occupy a minimum space.
- F. All horizontal lines carrying liquids shall be pitched to facilitate draining and all low points shall be provided with $\frac{3}{4}$ -inch hose bibs suitable for the material being handled, located so that the entire system can be drained unless otherwise shown on the drawings.
- G. Piping running parallel to walls shall be placed a minimum of 1½-inches out from the face of walls and at least **3-inches** below ceilings, unless otherwise shown on the drawings. Pipe supports and expansion joints shall be provided to satisfy the following conditions:

Pipe Material	Max. Pipe Support Spacing	Liquid Piping (Max. Length Straight Run wo/Bend or Expansion Joint)	Air Piping (Max. Length Straight Run wo/Bend or Expansion Joint)
Ductile Iron/Steel - 6-inch & Over - 5-inch & Under	14-feet 12-feet	80-feet 50-feet	40-feet 25-feet
Copper - Over 2-inch - 2-inch & Under	10-feet 7-feet	50-feet 50-feet	
Plastic & Fiberglass Reinforced Plastic - Over 3-inch - 3-inch & Under	9-feet 6-feet	30-feet 30-feet	

- H. CONTRACTOR shall furnish the ENGINEER/ARCHITECT with shop drawing submittal the type of expansion and contraction system proposed, including location of each joint.
- I. On all interior exposed flanged pipes, provide full faced rubber gaskets and zinc plated nuts and bolts. For all submerged applications, use full faced gaskets with stainless steel bolts and nuts.

2.02 BURIED PIPE PLACEMENT

- A. All trenching, backfilling and compacting work required for pipe placement shall conform to the appropriate section in Division 2 - Earthwork, of the specifications.
- B. All trench shoring shall be in conformance with established safety standards. Site drainage, dewatering and rock excavation shall conform to Division 2.
- C. The embedment of all pipe shall conform to the class of bedding requirements for Class A, Concrete Cradle or Concrete Arch Bedding; Class B, First-Class Bedding; or Class C, Ordinary Bedding as specified and detailed in the ASCE Manual and Reports on Engineering Practice, No. 37, Design and Construction of Sanitary and Storm Sewers.
- D. Class B bedding shall be furnished and provided for all plastic pipe materials and Class C bedding shall be furnished and supplied for all ductile iron, steel, concrete and copper pipe materials unless otherwise specified. Class A pipe bedding shall be furnished only where specified on the drawings and specifications.

PART 3 - EXECUTION

3.01 PIPE TESTING

- A. All pressure piping shall be hydrostatically tested in accordance Division 2.

END OF SECTION

SECTION 15062
DUCTILE IRON PIPE

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. Ductile iron pipe shall be used where shown on the drawings and indicated in the specifications. All ductile iron pipe and fittings shall conform to the physical requirements and specifications of the latest revisions of applicable American Waterworks Association (AWWA) Standards and applicable standards of the American National Standards Institute (ANSI).
- B. All pipe in interior or exposed exterior locations shall be flanged-joint ductile iron pipe.
- C. All pipe located in buried conditions shall be either mechanical joint or push-on joint ductile iron pipe unless otherwise specified, except that all air piping must be mechanical joint.
- D. Each pipe shall have the weight class or nominal thickness, casting period, manufacturer's mark and the year the pipe was produced conspicuously painted or marked on it.

1.02 SUBMITTALS

- A. Shop Drawings
 - 1. Submit shop drawings.
- B. Operation & Maintenance Data
 - 1. Submit.

PART 2 - PRODUCTS

2.01 FLANGED PIPE

- A. The pipe shall be rated for 250 psi working pressure and have a minimum wall thickness conforming to a Class 53 standard thickness in accordance with AWWA C-151 or ANSI A-21.51.
- B. Flanged joints shall be in accordance with AWWA C-115 or ANSI B-16.1, A-21.10 and A-21.15. The joints shall be provided with 1/16-inch thick full faced rubber gaskets in accordance with ASTM D-1330 and hexagonal heavy pattern nuts and chamfered end bolts all in accordance with ANSI B-16.1., zinc plated for interior applications and stainless steel for exterior or submerged applications. The flange shall have a 125 lb. template, unless otherwise specified. All joints shall be assembled in accordance with the manufacturer's recommendations.
- C. The pipe shall extend through the flange and shall be fully faced by machine finishing in a single operation. The flange face shall be flat and perpendicular to the pipe centerline. Gasket buildup shall not be permitted to compensate for partially faced flange surfaces.
- D. Flanged fittings may be either ductile iron or cast iron in accordance with AWWA C-110 or ANSI A-21.10 and A-21.15. All fittings 12-inches and under shall have a 250 psi pressure rating and all fittings over 12-inches shall have a 150 psi pressure rating. All flange fittings shall be provided with 125 lb. templates in accordance with ANSI B-16.1 unless otherwise specified.

- E. Flange coupling adapters shall be installed where indicated on the drawings and shall be EBAA Iron "Mega Flange", installed in accordance with the manufacturer's recommendations, and be restrained with tie rods where indicated.

2.02 MECHANICAL JOINT PIPE

- A. The pipe shall be rated for 250 psi working pressure and have a minimum wall thickness conforming to a Class 52 standard thickness in accordance with AWWA C-151 or ANSI A-21.51, unless otherwise specified on the drawings.
- B. Mechanical joints shall be in accordance with AWWA C-111 or ANSI A-21.11. Mechanical joints shall be carefully assembled in accordance with the manufacturer's recommendations. Any leaking joint shall be disassembled, cleaned and reassembled. Over tightening of the bolts to compensate for poor installation practice shall not be permitted. Gaskets shall be rubber for water piping and specially rated for high temperatures for air piping. All surfaces should be brushed with soapy water before placing the gasket on the pipe. Glands shall be ductile iron. All nuts and bolts shall be "Cor-Blue", as manufactured by NSS Industries, or equal.
- C. Mechanical joint fittings may be either ductile iron or cast iron and shall meet the physical requirements of AWWA C-110 or ANSI A-21.10 and the joint requirements of AWWA C-111 or ANSI A-21.11 specifications. All fittings 12-inches and under shall have a 250 psi pressure rating and all fittings 14-inches and larger shall have a 150 psi rating.
- D. All pipe 10-inches and larger shall have a cable bond system for electrical continuity.
- E. Where restrained joints are required, use EBAA Iron, Inc. "Megalug" restraining glands, or equal. Install per manufacturer's recommendations.

2.03 PUSH-ON JOINT PIPE

- A. The pipe shall be rated for 250 psi working pressure and have a minimum wall thickness conforming to a Class 52 standard thickness in accordance with AWWA C-151 or ANSI A-21.51 unless otherwise specified in on the drawings. All field cut pipe must be beveled at the outside edge of the cut to smooth all sharp corners.
- B. All push-on joints shall be in accordance with AWWA C-111 or ANSI A-21.11. Push-on joints shall be carefully assembled in accordance with the manufacturer's recommendations. Gaskets shall be of a synthetic rubber. All joint surfaces shall be cleaned and lubricated with a non-toxic lubricant recommended by the pipe manufacturer for use in potable water and must be kept clean and stored in closed containers.
- C. Push-on joint fittings may be either ductile iron or cast iron and shall meet the physical requirements of AWWA C-110 or ANSI A-21.10 and the joint requirements of AWWA C-111 or ANSI A-21.11 specifications. All fittings 12-inches and under shall have a 250 psi pressure rating and all fittings 14-inches and over shall have a 150 psi pressure rating.
- D. Two (2) serrated brass wedges shall be provided for each joint up to 12-inches of pipe diameter and four (4) wedges provided for each joint on pipe larger than 12-inches or a cable bond system utilized.

2.04 BALL JOINT FLEXIBLE DUCTILE IRON PIPE

- A. The pipe shall be rated for 250 psi working pressure and have a minimum wall thickness conforming to Class 54 in 4-inch and 6-inch pipe diameter, Class 55 in 8-inch, 10-inch, and 12-inch pipe diameters and Class 56 in 14-inch, 16-inch, and 18-inch diameters. These standard thicknesses are to be in accordance with ANSI A-21.51. These standard class thicknesses are not necessarily adequate to overcome the effect of buoyancy.
- B. The joint shall be a flexible, boltless, self-restraining, ball and socket type joint meeting the applicable requirements of ANSI A-21.10. The joint shall provide a full 15° of joint deflection with no reduction in the waterway. The gasket shall be of a high quality rubber

designed to provide a leak-proof joint. Installation and assembly of the pipe shall be in strict accordance with the manufacturer's recommendations.

- C. Connections to other types of piping shall be with an approved connecting piece specifically manufactured for that use.

2.05 PIPE & FITTING LININGS & COATINGS

- A. A cement mortar lining with a bituminous seal coat in accordance with AWWA C-104 or ANSI A-21.4 shall be provided in the interior of all flanged, mechanical joint or push-on pipe and fittings unless otherwise stated on the drawings or specifications that a special lining is required. The standard cement lining shall not be less than 1/16-inch thick on all pipe up to 12-inches in diameter, and 3/32-inch thick on all pipe 14-inches through 24-inches in diameter.
- B. All air service piping and fittings shall be unlined and un-coated on the interior. Exterior coating shall be standard asphaltic on buried applications. High temperature gasket required.
- C. The exterior of all piping and fittings used in buried applications shall be shop coated with a bituminous coating not less than 1.0 mil thick.
- D. The exterior of all piping and fittings used in interior or exposed applications shall be supplied without the bituminous coating but shall have a shop coat of Tnemec Shop Primer 37-77, or similar coating by Mobil, PPG, or equal.
- E. The exterior of all piping and fittings used in submerged non-potable water or wastewater applications shall be shop coated with an epoxy primer, Tnemec Series 69, not less than 6 mils DFT.
- F. The exterior of all piping and fittings used in submerged potable water applications shall be shop coated with a State Regulatory Agency and NSF approved coating system equal to a Tnemec Series 20 epoxy coating, 6 mils DFT.

PART 3 - EXECUTION

Not Applicable.

END OF SECTION

SECTION 15064

POLYVINYL CHLORIDE PIPE

PART 1 - GENERAL

1.01 SUBMITTALS

- A. Shop Drawings
 - 1. Submit shop drawings.

PART 2 - PRODUCTS

2.01 WASTE VENT & DRAINAGE PIPING

- A. Schedule 40, Type 1, PVC 1120 rigid pipe in accordance with ASTM D-1785 normal impact rated.
- B. PVC fittings shall conform to ASTM D-2466 and have solvent welded joints made with an approved PVC solvent cement in accordance with ASTM D-2564.
- C. Installation practices shall be in compliance with the manufacturer's recommendation.

2.02 PROCESS PIPING

- A. Schedule 80, Type 1, PVC 1120 rigid pipe in accordance with ASTM D-1785, normal impact rated at 165°F and 150 psi water working pressure.
- B. PVC fittings shall conform to the requirements of ASTM D-2467 for socket type and D-2464 for threaded type. Solvent welded joints made with an approved PVC solvent cement in accordance with ASTM D-2564.
- C. All connections to valves, pumps or other equipment shall be made with approved couplings, bushings, flanges, unions or threaded adapters solvent welded to the pipe. No pipe threads are permitted on the end of PVC pipe. Below grade applications shall utilize gasket joints.
- D. All in line valves on PVC piping shall be of a true-union design for removal.
- E. Installation practices, including support spacing, shall be in compliance with the manufacturer's recommendations.

2.03 PVC SEWER PIPE & FITTINGS

- A. Pipe and fittings furnished shall meet the requirements for "Type PSM Polyvinyl Chloride (PVC) Sewer Pipe and Fittings" as set forth in ASTM Designation D-3034 and subsequent revisions thereof.
- B. The dimensions of the pipe shall be in accordance with Table 15064-1 (SDR rating 35). The wall thickness shall not be less than that specified except that isolated arcs spanning no more than 15° of the perimeter shall be not less than 95% of the specified minimum.

Table 15064-1 - Pipe Dimensions

Nominal Size	Average O.D.	Minimum Wall Thickness	Tolerance On Average (more or less)
4	4.215	0.125	0.009
6	6.275	0.180	0.011
8	8.400	0.240	0.012
10	10.500	0.300	0.015
12	12.500	0.360	0.018
15	15.300	0.437	0.023

- C. PVC pipe and fittings shall be marked as follows:
1. Each length of pipe shall be clearly marked as follows in intervals of 5-feet or less and each fitting shall be marked as follows:
 - a. Manufacturer's name or trademark.
 - b. Nominal pipe size.
 - c. The PVC cell classification, e.g., 12454-B.
 - d. The legend "Type PSM PVC Sewer Pipe."
 - e. ASTM Designation D-3034.
- D. Fittings such as saddles, elbows, tees, wyes and others shall be of material, construction and joint design corresponding to the adjacent pipe. All pipe and fittings on any one project shall be by one manufacturer and shall have only one kind of joint, either Solvent Weld or Elastomeric. Only pipe by manufacturers whose pipe and joint are judged to be acceptable for use by the governing State agency in the project location for pipe Specification Designation D-3034 will be considered.
- E. Installation of pipe shall conform to ASTM Specification Designation D-2321, Recommended Practice for Underground Installation of Flexible Thermoplastic Sewer Pipe.
- F. All PVC pipe shall be bedded with Class "B" bedding. The cost of furnishing, hauling, placing, and tamping this bedding shall be included by the CONTRACTOR in the lump sum or bid price for the piping.
- G. The use of 4-inch and 6-inch PVC pipe to the property line is subject to the approval of the OWNER and the State Plumbing Division.
- H. The entire length of the installed main line pipe shall be tested for acceptance with an approved go-no-go acceptance testing device to measure the deflection of the installed pipe. This device shall be a rigidly constructed cylinder, or other approved shape, which will not change shape or size when subjected to forces exerted on it by the pipe wall.
- I. The test shall be conducted after all backfill has been placed and consolidated, but before paving is constructed. Any section of the completed sewer failing to pass this test shall be repaired and re-tested. All testing shall be done under the supervision of the ENGINEER/ARCHITECT.
- J. For acceptance, the device must pass through the entire section between manholes or other structures in one pass when pulled by hand without the use of excessive force.
- K. The CONTRACTOR shall furnish the testing device, all materials, equipment and labor for making this acceptance test.

- L. The dimensions of the testing device shall be 95% of the sewer line inside diameter if tested within 30-days of installation and 92.5% if tested after 30-days of installation. Those sections of line meeting these requirements shall be accepted. Any section not meeting these requirements shall be repaired and tested. All testing shall be done under the observation of the ENGINEER/ARCHITECT.
- M. Water stops able to make a watertight installation shall be used at all piping connections into manholes or structures.

2.04 PRESSURE PIPE & FITTINGS

- A. This specification designates general requirements for Polyvinyl Chloride (PVC) Plastic Municipal Water Pipe with integral bell and spigot joints for the conveyance of water and other fluids.
- B. Pipe 4-inch through 12-inch shall meet the requirements of AWWA C-900 "Polyvinyl Chloride (PVC) Pressure Pipe." Pipe shall conform to the requirements of DR-18 (Pressure Class 150), unless otherwise noted on the drawings. Pipe 14-inch through 35-inch shall meet the requirements of AWWA C-905 "Polyvinyl Chloride (PVC) Water Transmission Pipe". Pipe shall conform to the requirements of DR-25 (Pressure Class 165) with CI outside diameter, unless otherwise noted on the drawings.
- C. All pipe shall be suitable for use as a pressure conduit. Provisions must be made for expansion and contraction at each joint with an elastomeric ring. The bell shall consist of an integral wall section with an elastomeric ring that meets the requirements of ASTM F-477 Standard Specification for elastomeric seals (gaskets for jointing plastic pipe). The wall thickness in the bell section shall conform to the requirements of ASTM D-3139
- D. Service taps to all PVC pipe shall be made with the use of a tapping saddle. Direct tapping shall not be permitted unless allowed by the pipe manufacturer and with the permission of the ENGINEER/ARCHITECT. All service taps shall be in accordance with the manufacturer's recommended procedures.
- E. Standard laying lengths shall be 20-feet, ± 1 -inch for all sizes. At least 85% of the total footage of pipe at any size shall be furnished in standard lengths, the remaining 15% in random lengths shall not be less than 10-feet long.
- F. Each standard and random length of pipe shall be tested to four (4) times the design pressure of the pipe for a minimum of 5-seconds. The integral bell shall be tested with the pipe.
- G. Randomly selected samples tested in accordance with ASTM D-1599 shall withstand, without failure, pressures listed below when applied in 60-70 seconds. Class 150 shall have a minimum burst pressure of 755 psi at 73°F.
- H. The following standards shall apply for PVC pressure pipe:
 1. AWWA C-900 - Polyvinyl chloride (PVC) pressure pipe 4-inches through 12-inches.
 2. AWWA C-905 - Polyvinyl chloride (PVC) pressure pipe, 16-inches and larger.
 3. AWWA C-111 - Standard for rubber gasket joints for cast iron pipe and fittings.
 4. ASTM D-1784 - Specification for polyvinyl chloride (PVC) compounds.
 5. ASTM D-3139 - Joints for plastic pressure pipe using elastomeric seals.
 6. ASTM F-477 - Specification for elastomeric seals.

- I. Fittings shall be cast or ductile iron with mechanical joint ends conforming to AWWA C-10 and C-111. Bolts and nuts used for glands shall be "Cor-Blue", with gaskets suitable for pipe type and end use.
- J. PVC pipe should be installed in accordance with the Uni-Bell Plastic Pipe Association guide for installation of polyvinyl chloride plastic pressure pipe for municipal water main distribution systems. A Type "B" bedding shall be provided for all PVC pressure pipe.

PART 3 - EXECUTION

Not Applicable.

END OF SECTION

SECTION 15066

STAINLESS STEEL PIPE

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. The CONTRACTOR shall furnish and install stainless steel piping systems complete and ready for service.

1.02 REFERENCES

- A. ASTM A403 - Standard Specification For Wrought Austenitic Stainless Steel Pipe Fittings.
- B. ASTM A774 - Standard Specification For As-Welded Wrought Austenitic Stainless Steel Fittings For General Corrosive Service At Low And Moderate Temperatures.
- C. ASTM A778 - Standard Specification For Welded, Un-annealed Austenitic Stainless Steel Tubular Products.

PART 2 - PRODUCTS

2.01 STAINLESS STEEL PIPE

- A. Pipe shall conform to ASTM A-778 and shall be Type 304L, except where 316L is specifically noted on the drawings.
- B. Air Main: Schedule 5.
- C. Process Pipe: Schedule 10.

2.02 STAINLESS STEEL FITTINGS

- A. Fittings and fabrications shall conform to ASTM A-774 and A-403.
- B. Fittings and fabrications shall be Type 304L or 316L stainless steel.

2.03 STAINLESS STEEL FLANGED CONNECTIONS

- A. Stainless Steel Angle Face Rings: Type 316L.
- B. Backup Flanges: Steel or ductile iron per ASTM A-53, or ASTM A-536, painted.
- C. Stainless steel hardware required.
- D. Gaskets: EPDM for air service and neoprene for process piping, unless service indicates otherwise.
- E. Furnish all nuts, bolts and washers, including anchor bolts, on 18-8 Series stainless steel.

2.04 FINISH

- A. Number 2 finish or better.
- B. Shop fabricated pipe shall be pickled and passivated by the manufacturer (immersion for a minimum of 15-minutes in 10% nitric acid and 3% hydrofluoric acid at 125°F, followed by a neutralizing rinse).

- C. All pipe, fittings and fabrications shall be line-marked with type, schedule and heat number.

2.05 SUPPORTS

- A. Supports and hangers shall be stainless steel, Type 304L, or fiberglass; as manufactured by Felker Brothers Corporation.

PART 3 - EXECUTION

3.01 WELDING

- A. Do all welding in the factory using shielded arc, inert gas, MIG or TIG method.
- B. Add filler wire to all welds to provide for a cross-section; and weld metal thickness equal to or greater than the parent metal.
- C. Full penetrate butt welds to the interior surface.
- D. Continuously weld both sides of the rings and flanges.
- E. Welding in the field is to be minimized and, as such, field welding shall NOT be permitted, unless authorized by the ENGINEER.
- F. Passivate all welded stainless steel fabrications using the following procedure:
 - 1. Wire brush all outside weld areas to remove weld splatter. Brushes shall be of stainless steel and used only on stainless steel.
 - 2. Remove all carbon deposits, greases and oils by pickling and neutralization to aid the regeneration of a uniform, corrosion resistant, chromium oxide film.
 - 3. Completely immerse all stainless assemblies and parts after welding and brushing in a pickling solution of 6% nitric acid and 3% hydrofluoric acid at 140°F for a minimum of 15-minutes. Parts shall be free of iron particles or other foreign material after this procedure.
 - 4. Neutralize all stainless steel assemblies and parts previously pickled by immersion in a tri-sodium phosphate rinse.

3.02 INSTALLATION

- A. Piping work shall be completed in accordance with the arrangements shown on the drawings. The piping runs are, in part, diagrammatic and the CONTRACTOR shall complete the system as to fit the field conditions.

END OF SECTION

SECTION 15080

PIPING SPECIALTIES

PART 1 - GENERAL

1.01 SUBMITTALS

- A. Shop Drawings
 - 1. Submit shop drawings.
- B. Operation & Maintenance Data
 - 1. Submit.

PART 2 - PRODUCTS

2.01 SLEEVE TYPE COUPLINGS

- A. Sleeve type couplings shall be of the style shown on the drawings. Couplings shall be shop coated when leaving factory. Gaskets shall be Plain Grade. The CONTRACTOR shall install tie rods to bridge the coupling where it is necessary to suitably restrain any pipe movement due to pressure or pipe thrust.
- B. The pipe shall be cut with smooth ends to provide a space between pipe ends of ¼-inch to 1-inch.
- C. The couplings shall be Dresser 38, Smith-Blair, or equal.

2.02 FLANGE ADAPTERS

- A. Flange adapters shall be used where indicated on the drawings and conform in size and bolt hole placement to USASI standards for steel and/or cast iron flanges as required by the drawings and specifications. The adapters shall be Mega flanges, as manufactured by EBAA Iron, Inc., or equal. All flanged coupling adapters shall be restrained with tie rods, where noted.

2.03 FLANGED FLEXIBLE COUPLINGS

- A. Flexible couplings to deaden transmission of vibration shall be of diameter and length required by the drawings, single arch expansion joint, full faced flanges drilled 125# American Standard, Type EJR, butyl rubber, wire and fabric reinforced body and steel backup ring. Flexible couplings shall be as manufactured by General Rubber Company, Mercer Rubber Company, Mason Industries, Inc., or equal.

2.04 CAST IRON WALL SLEEVES

- A. All piping passing through concrete or masonry shall be installed through sleeves as provided for and stated on the drawings. The patterns to be provided are stated on the drawings. "Omni-Sleeves" may be substituted where specific fittings are not attached to the wall sleeves.
- B. All sleeves shall be installed before the concrete is placed or when masonry is laid.
- C. All wall sleeves in exterior or water bearing walls shall have water-tight joints.

2.05 PIPE SLEEVES

- A. Pipes passing through floors and walls shall be fitted with sleeves. Each sleeve shall extend through its respective floor or wall, and shall be cut flush with each surface unless otherwise required. Sleeves shall be at least 1/4-inch larger in diameter than the passing pipe when the pipe is uncovered, and one pipe size larger than the overall outside diameter of the pipe when insulated. Sleeves in bearing walls shall be made of steel pipe. Sleeves in other walls shall be 20 gauge metal. All sleeves shall be properly installed and fastened in place.
- B. All sleeves and openings through walls, ceilings or floors shall be made dust and gas tight by caulking and the use of sealants on each side.

2.06 WALL PIPE

- A. Wall pipe shall be furnished in the type and style and installed where indicated on the drawings. All wall pipe shall be installed before concrete walls are poured and be properly aligned and secured in place.
- B. All wall pipe shall be lined equal to that specified for the pipe to which it is connected.

PART 3 - EXECUTION

Not applicable.

END OF SECTION

SECTION 15092

WALL SEALS

PART 1 - GENERAL

1.01 SUBMITTALS

A. Shop Drawings

1. Submit shop drawings.

PART 2 - PRODUCTS

2.01 DESIGN CRITERIA

- A. Pipe to wall penetration closures shall be of the modular mechanical type consisting of interlocking synthetic rubber links shaped to continuously fill the annular space between the pipe and wall opening. Links shall be loosely assembled with bolts to form a continuous rubber belt around the pipe with a pressure plate under each bolt head and nut. After the seal assembly is positioned in the sleeve, tightening of the bolts shall cause the rubber sealing elements to expand and provide an absolutely watertight seal between the pipe and wall opening. All bolts, nuts and washers shall be 316 stainless steel.

PART 3 - EXECUTION

Not Applicable.

END OF SECTION

SECTION 15093
FLEXIBLE CONNECTORS

PART 1 - GENERAL

1.01 SUBMITTALS

A. Shop Drawings

1. Submit shop drawings.

PART 2 - PRODUCTS

2.01 DESIGN CRITERIA

- A. A single piece leak-proof single arch reinforced tube shall extend from flange to flange, furnished in chlorobutyl. The body shall be made of multiple plies of dacron impregnated with adhesive compounds for maximum ply-to-ply adhesion. Steel reinforcing wire shall be imbedded in the body of a layer of corrosion and age resistant synthetic rubber. Cover compounds shall be furnished to resist acids, oils, fumes and sunlight. The full-faced flanged pipe ends shall be an integral part of the body, with edges completely rubber covered and constructed of resilient rubber, smooth finished to form a tight seal against the pipe flange without the need of gaskets. All units shall be furnished with Standard 125-pound drilling, with split steel retaining rings installed on all flanged units on the inside of the flange and bolted through it to the metal pipe flange.

2.02 SPECIAL REQUIREMENTS

- A. On clean water application, the arch shall be unfilled.
- B. On all wastewater or sludge applications, the arch shall be filled.
- C. On air service applications, the arch shall be unfilled and be specially designed to resist temperatures up to 250°F.
- D. Furnish with control rods or bolts on discharge sides of all pumps or compressors.

PART 3 - EXECUTION

Not Applicable.

END OF SECTION

SECTION 15094
FLEXIBLE CONNECTORS

PART 1 - GENERAL**1.01 SUBMITTALS**

- A. Shop Drawings
1. Submit shop drawings.

PART 2 - PRODUCTS**2.01 SLIP-ON ELASTOMERIC COUPLING**

- A. Provide slip-on type, flexible connectors for:
1. Blower intake / discharge.
 2. Vent piping connections.
 3. As required by drawings.
- B. General Rubber, Style 1081, or equal.
1. Minimum Services Temperature: 250°F.
 2. Pressure Rating: 45 psig.
 3. Axial Compression: 1-inch.
 4. Axial Elongation: 3/4-inch.
 5. Transverse Deflection: $\pm \frac{1}{2}$ -inch.
 6. Tube: Butyl.
 7. Carcass: Polyester Fabric.
 8. Cover: Butyl.
 9. Clamps: $\frac{1}{2}$ -inch Stainless Steel.

2.02 FLEXIBLE CONNECTORS

- A. Furnish and install flanged single arch type expansion joint on pump suction and discharge connections, as shown on drawings.
- B. General Rubber, Style 1015, or equal.
1. ANSI B16.1 125/150 flange drilling.
 2. Unfilled single arch design.
 3. Filled single arch design.
 4. Minimum Service Temperature: 250°F.
 5. Pressure Rating: 190 psig.

- | | | |
|----|----------------|------------------------|
| 6. | Tube: | Chlorobutyl. |
| 7. | Cover: | Chlorobutyl. |
| 8. | Reinforcement: | Polyester/Steel Rings. |

C. Special Requirements

1. On clean water or screened wastewater applications, the arch shall be unfilled.
2. On all unscreened wastewater or sludge applications, the arch shall be filled.
3. On air service applications, the arch shall be unfilled and be specially designed to resist temperatures in excess of 250°F. Provide alternate materials with higher temperature ratings, where required.
4. Furnish with control rods or bolts on discharge sides of all pumps or compressors.
5. Furnish straight or non-reducing type and either concentric or eccentric tapered type, as indicated on the drawings.

PART 3 - EXECUTION

Not Applicable.

END OF SECTION

SECTION 15101**VALVE IDENTIFICATION TAGS****PART 1 - GENERAL****1.01 SUBMITTALS****A. Shop Drawings**

1. Submit shop drawings.

PART 2 - PRODUCTS**2.01 DESIGN CRITERIA**

- A. The CONTRACTOR shall furnish and install a brass tag on all valves indicating the type of valve and valve number. Valve tags shall not be less than 1½-inches in diameter with ¼-inch high letters above ½-inch high numbers. Buried valves shall have numbers painted on valve box or manhole covers. CONTRACTOR shall submit the valve list to the ENGINEER/ARCHITECT within sixty (60) days of Notice to Proceed for numbering. The CONTRACTOR shall then tag all valves following the numbering and sequencing provided by the ENGINEER/ARCHITECT. The CONTRACTOR shall provide the OWNER with a chart listing each valve by number, location and function. The chart shall be mounted in a suitable frame covered with glass.

- B. The letter identification for each type of valve shall be as follows:

1.	Air Release Valve	ARV
2.	Butterfly Valve	BV
3.	Ball Valve	BAV
4.	Check Valve	CV
5.	Gate Valve	GV
6.	Mud Valve	MV
7.	Plug Valve	PV
8.	Pinch Valve	P
9.	Pressure Relief Valve	PRV
10.	Solenoid Valve	SV
11.	Telescopic Valve	TV
12.	Plumbing (Potable Water)	PLBG
13.	Non Potable Water	NPW
14.	Heating	HTG

PART 3 - EXECUTION

Not Applicable.

END OF SECTION

15101-1

SECTION 15103

PLUG VALVES

PART 1 - GENERAL

1.01 SUMMARY

- A. Furnish and install plug valves and operators complete and ready for OWNER's use.
- B. Plug valves shall be eccentric type.
- C. Plug valves shall provide drip-tight shut off in either direction.

1.02 SUBMITTALS

- A. Shop Drawings
 - 1. Submit shop drawings.
 - 2. Submittals shall include:
 - a. Materials of construction for all components.
 - b. Shaft seals and bearings.
 - c. Pressure rating.
 - d. Actuator.
 - 3. Operation & Maintenance Data
 - a. Submit Operation & Maintenance Data.
 - b. Replacement part numbers.
 - c. Routine maintenance requirements.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Plug valves shall be as manufactured by DeZurik, Valmatic or equal.

2.02 DESIGN CRITERIA

- A. General
 - 1. Non-lubricated, eccentric type.
 - 2. Resilient faced plugs.
 - 3. Flanged Valves: ANSI 125/150 lb. standard.
 - 4. Mechanical Joint Valves: AWWA C-111.
 - 5. Grooved End Valves: AWWA C-606.
 - 6. Screwed Valves: NPT standard.

B. Valve Bodies

1. ASTM A-126, Class B cast iron.
2. Sizes 4-inches & Larger: 1/8-inch welded overlay seat of not less than 90% pure nickel.
3. Raised seat area, completely covered with nickel.
4. Screwed-in seats are not equal to welded seats.

C. Plugs

1. ASTM A-126, Class B cast iron.
2. Seating Surface: Cylindrical, eccentricity off-set from the center of the plug shaft.
3. In the closed position, the seating between the plug face and body seat shall be externally adjustable in the field with the line under pressure.
4. Plug Facing: Resilient faced neoprene.

D. Bearings

1. Metal, sleeve type, permanently lubricated.
2. Sizes 1/2-inch to 36-inch: 316 or 317L stainless steel.
3. Sizes 42-inch to 54-inch: ASTM B-30 aluminum bronze alloy with 316 stainless steel sleeve.

E. Shaft Seals

1. Multiple V-ring type, O-ring type is not equal.
2. Externally adjustable and replaceable without removing the bonnet or valve actuator, while under pressure.

F. Pressure Rating

1. Sizes 1/2-inch to 12-inch: 175 psig.
2. Sizes 14-inch to 72-inch: 150 psig.

G. Port Area

1. Sizes 1/2-inch to 20-inch: 80% or pipe area, minimum.
2. Sizes 24-inch to 72-inch: 70% of pipe area, minimum.

H. Manual Actuators

1. Lever, gear, tee wrench, extended stem, floor stand, etc., as indicated on the drawings.
2. Valve 8-inch and larger shall be equipped with gear actuators. Enclose gearing in semi-steel housing with seal lubrication fittings. Support gear actuator shaft and quadrant on permanently lubricated bronze bearings.
3. Right angle chain wheel operators shall be provided for all valves 6'-0" or more, above the finished floor, regardless of whether or not it is indicated on the drawings.

4. Actuators shall clearly indicate valve position.
5. Adjustable stop to set closing torque.
6. Exposed nuts, bolts and washers:
 - a. Interior - Zinc plated or stainless steel.
 - b. Exterior - Stainless steel.
- I. Buried Valves/Submersible Valves
 1. Stainless steel nuts, bolts and washers.
 2. Provide shaft seals, gaskets and covers to prevent water from entering the valve and actuator.
 3. Provide brackets and bonnets.
 4. Provide "Tyler" type valve boxes for use with nut operated valves. Boxes shall be cast iron, screw type, complete with top and bottom sections and cover. Box length as required by grades.
 5. Construct valve manholes where depth precludes the use of valve boxes. Refer to Division 2 for manhole requirements.
 6. Extend valve stems as required.
 7. Provide one (1) tee wrench for every ten (10) valves provided with a square nut operator.
- J. Valve Numbering
 1. Number valves in accordance with Division 15, Section 15101.

PART 3 - EXECUTION

Not Applicable.

END OF SECTION

15103-3

SECTION 15104
BUTTERFLY VALVES

PART 1 - GENERAL

1.01 SUBMITTALS

- A. Shop Drawings
 - 1. Submit shop drawings.
- B. Operation & Maintenance Data
 - 1. Submit.

PART 2 - PRODUCTS

2.01 AIR SERVICE

- A. Butterfly valves shall be of the wafer design. Flangeless or lug bodies shall be suitable for use between ANSI 125 or 150 pound flanges.
- B. Valve bodies shall be of ASTM A-126-61 Class B cast iron. Bodies of the flangeless design shall be provided with at least four (4) flange bolt guides to center the valve in the pipeline. Lug body valves shall have a retained seat and shall provide tight shutoff to the full rating of the valve on dead end service or isolation service without the use of down stream flanges. Valve seats not molded into the body shall be molded to a rigid non-corrosive reinforcing ring.
- C. Valves shall be of the offset disc design allowing a full annular seating surface uninterrupted by the shaft. Disc-to-shaft connection shall be accomplished without upstream-downstream holes through the disc and be of a locked type allowing zero backlash.
- D. Discs shall be all bronze or ASTM A-126-61 Class B cast iron with a welded nickel sealing edge. Sprayed or plated edges are not acceptable.
- E. Shafts shall be supported on self-lubricating bronze bearings.
- F. Valves 8-inches and larger shall have a stainless or bronze shaft thrust collar. Latch lock levers shall provide automatic, positive latching in the open, closed or ten intermediate positions.
- G. Infinite position levers must allow manual throttling and locking in any position from open to closed.
- H. Handwheel actuator must have adjustable open and closed position stops.
- I. Pneumatic cylinder actuators shall be of the stationary type and no pivoting cylinders shall be allowed. Cylinder actuators must have adjustable open and closed position stops.
- J. Valves to be identified according to Division 15 - Valve Identification Tags.

PART 3 - EXECUTION

Not Applicable.

END OF SECTION

15104-1

SECTION 15112

IN-LINE CHECK VALVES

PART 1 - GENERAL

1.01 SUBMITTALS

- A. Shop Drawings
 - 1. Submit shop drawings.
- B. Operation & Maintenance Data
 - 1. Submit.

PART 2 - PRODUCTS

2.01 DESIGN CRITERIA

- A. Check valves shall be Series 39, as manufactured by Red Valve or equal.
- B. Valve body shall be cast iron ASTM A-126, ANSI Close 125, epoxy or rubber lined with flanges. 6-inch to 16-inch valves shall have a 4-inch clean-out plug and two (2) 1-inch flush connections.
- C. Check sleeve shall be fabric-reinforced hypalon, design to handle abrasive municipal sewage sludge.
- D. Valves to be identified according to Division 15 - Valve Identification Tags.

PART 3 - EXECUTION

Not Applicable.

END OF SECTION

SECTION 15140
SUPPORTS & ANCHORS

PART 1 - GENERAL**1.01 SUBMITTALS**

- A. Shop Drawings
 - 1. Submit shop drawings.
 - 2. Indicate hanger and support framing and attachment methods.

PART 2 - PRODUCTS**2.01 PIPE HANGERS & SUPPORTS**

- A. Hangers for pipe Sizes ½-inch to 4-inches and cold pipe sizes 6-inches and over: Carbon steel, adjustable, clevis, Michigan Number 400 or equal.
- B. Hangers for hot pipe sizes 6-inches and over: Adjustable steel yoke, cast iron roll, Michigan Number 610 or equal.
- C. Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods; cast iron roll and stand for hot pipe sizes 6-inches and over. Uni-strut type hangers are acceptable for multiple pipe installation.
- D. Vertical Support: Steel riser clamp compatible with pipe material; PVC coated for plastic and copper pipe.
- E. Copper Pipe Support - Non-Insulated: Carbon steel ring, adjustable, copper plated or PVC coated, Michigan number 101 or 102A or equal.
- F. Plastic Pipe Support - Non-Insulated: Carbon steel ring, adjustable PVC coated, Michigan number 102 or equal.
- G. Shield for insulated piping 2-inches and smaller: 18 gauge galvanized steel shield over insulation in 180° segments, minimum 12-inches long at pipe support.
- H. Shield for insulated piping 2½-inches and larger (except cold water piping): Pipe covering protective saddles.
- I. Shields for insulated cold water piping 2½-inches and larger: Hard block non-conducting saddles in 90° segments, 12-inch (300 mm) minimum length, block thickness same as insulation thickness.
- J. All hangers shall be oversize so that insulation extends continuous through hanger for all insulated piping with vapor barrier.

2.02 HANGER RODS

- A. Steel Hanger Rods: Galvanized, threaded both ends, or continuous threaded.

2.03 INSERTS

- A. Inserts: Malleable iron case of galvanized steel shell and expander plug for threaded connection with lateral adjustment, top slot for reinforcing rods, lugs for attaching to forms; size inserts to suit threaded hanger rods.

2.04 EQUIPMENT PADS

- A. Fabricate curbs of Concrete 3½-inches thick to extend 6-inches beyond outer edge of equipment. Provide where indicated on the drawings.

2.05 SLEEVES

- A. Sleeves for Pipes Through Non-fire Rated Floors: Form with 18 gauge galvanized steel.
- B. Sleeves for Pipes Through Non-fire Rated Beams, Walls, Footings and Potentially Wet Floors: Form with galvanized steel pipe.
- C. Sleeves for Pipes Through Fire Rated and Fire Resistive Floors and Walls: Prefabricated fire rated sleeves including seals, UL listed, or sleeved and caulked per State Code related to fire penetrations.
- D. Sleeves for Round Ductwork: Form with galvanized steel.
- E. Sleeves for Rectangular Ductwork: Form with galvanized steel.
- F. Fire Stopping Insulation: Mineral Wool type, high temperature non-combustible.

2.06 FABRICATION

- A. Size sleeves large enough to allow for movement due to expansion and contraction. Provide for continuous insulation wrapping.
- B. Provide hangers with coating appropriate for the pipe material in contact with hanger.

2.07 FINISH

- A. Prime coat exposed steel hangers and supports. Hangers and supports located in crawl spaces, pipe shafts and suspended ceiling spaces are not considered exposed.

PART 3 - EXECUTION

3.01 INSERTS

- A. Provide inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.
- B. Provide hooked rod to concrete reinforcement section for inserts carrying pipe over 4-inches.
- C. Where concrete slabs form finished ceiling, provide inserts to be flush with slab surface.
- D. Where inserts are omitted, provide self drilling anchor, expansion bolts or drill through concrete slab from below and provide thru-bolt with recessed square steel plate and nut above flush with top, recessed into and grouted flush with slab.

3.02 PIPE HANGERS & SUPPORTS

- A. Support horizontal piping as follows:

<u>Material</u>	<u>Size</u>	<u>Spacing</u>	<u>Diameter</u>
Steel	½"-1¼"	6'-6"	3/8"
	1½" - 2"	10'-0"	3/8"
	2½" - 3"	10'-0"	½"
	4" - 6"	10'-0"	5/8"
	8" - 12"	14'-0"	¾"

15140-2

	14" - 18"	20'-0"	7/8"
	20"	20'-0"	1"
	24"	20'-0"	1-1/8"
Ductile	3" - 6"	10'-0"	1/2"
	8" - 10"	20'-0"	3/4"
	12"	20'-0"	7/8"
	14" - 16"	20'-0"	1"
	18" - 20"	20'-0"	1-1/8"
	24"	20'-0"	1 1/2"
Copper	1/2" - 1 1/4"	6'-0"	3/8"
	1 1/2" - 2"	10'-0"	3/8"
	2 1/2" - 4"	10'-0"	1/2"
	5" - 6"	10'-0"	5/8"
Cast Iron	1 1/2" - 4"	5'-0"	3/8"
	5" - 6"	5'-0"	1/2"
	8" - 10"	5'-0"	5/8"
	12"	5'-0"	3/4"
Plastic	1/2" - 4"	4'-0"	3/8"
	6" - 8"	4'-0"	1/2"
	10" - 12"	4'-0"	5/8"

- B. Install hangers to provide minimum 1 1/2-inch space between finished covering and adjacent work.
- C. Place a hanger within 12-inches of each horizontal elbow.
- D. Use hangers with 1 1/2-inch minimum vertical adjustment.
- E. Support horizontal cast iron pipe adjacent to each hub, with 5-feet maximum spacing between hangers.
- F. Support vertical piping at every floor. Support vertical cast iron pipe at each floor at hub.
- G. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.
- H. Support riser piping independently of connected horizontal piping.
- I. At trapeze hangers and pipe supported by wall brackets, u-bolt pipe at each bracket or hanger.

3.03 EQUIPMENT BASES & SUPPORTS

- A. Provide templates, anchor bolts and accessories for mounting and anchoring equipment.
- B. Construct support of steel members. Brace and fasten with flanges bolted to structure.
- C. Provide rigid anchors for pipes after vibration isolation components are installed.

3.04 FLASHING

- A. Provide flexible flashing and metal counter flashing where piping and ductwork penetrate weather or waterproofed walls, floors and roofs.
- B. Flash floor drains in floors with topping over finished areas with lead or approved material, 10-inches clear on sides with minimum 36"x 36" sheet size. Fasten flashing to drain clamp device.

- C. Seal floor, shower, mop sink and drains installed above grade watertight to adjacent materials.
- D. Provide acoustical flashing around ducts and pipes penetrating equipment rooms, installed in accordance with manufacturer's instructions for sound control.
- E. Provide curbs for mechanical roof installations 14-inches minimum high above roofing surface. Flexible sheet flash and counter flash with sheet metal; seal watertight.

3.05 SLEEVES

- A. Set sleeves in position in form work. Provide reinforcing around sleeves.
- B. Extend sleeves through floors one inch above finished floor level. Calk sleeves full depth and provide floor plate.
- C. Where piping or ductwork penetrates floor, ceiling, or wall, close off space between pipe or duct and adjacent work with fire stopping insulation and calk air tight. Provide close fitting metal collar or escutcheon covers at both sides of penetration.
- D. Install stainless steel escutcheons at finished surfaces.

END OF SECTION

DIVISION 16 - ELECTRICAL

Page 1

SECTION 16010 - BASIC ELECTRICAL REQUIREMENTS

PART 1 - GENERAL

- 1.01 Section Includes.
- 1.02 Scope.
- 1.03 General Requirements.
- 1.04 Regulatory Requirements.
- 1.05 Drawings & Specifications.
- 1.06 Sequencing & Scheduling.
- 1.07 Submittals.
- 1.08 Temporary Power.
- 1.09 Record Documents.
- 1.10 Guarantees.

PART 2 - PRODUCTS

- 2.01 Materials & Equipment.
- 2.02 Manufacturers.
- 2.03 Listing Or Labeling.

PART 3 - EXECUTION

- 3.01 Equipment Wiring.
- 3.02 Final Tests & Demonstrations.
- 3.03 Start-Up.
- 3.04 Clean-Up & Painting.

SECTION 16020 - TEMPORARY ELECTRICAL

PART 1 - GENERAL

- 1.01 Scope Of Work.
- 1.02 Regulatory Requirements.

PART 2 - PRODUCTS

Not Applicable.

PART 3 - EXECUTION

- 3.01 Installation.

SECTION 16195 - ELECTRICAL IDENTIFICATION

PART 1 - GENERAL

- 1.01 Not Applicable.

PART 2 - PRODUCTS

- 2.01 Nameplates & Labels.
- 2.02 Wire Markers.
- 2.03 Conduit & Wireway Markers.
- 2.04 Laminated Tags.
- 2.05 Motor Labels.

PART 3 - EXECUTION

- 3.01 Preparation.
- 3.02 Application.

DIVISION 16 - ELECTRICAL

Page 2

SECTION 16483 - VARIABLE FREQUENCY DRIVES

PART 1 - GENERAL

1.01 Scope.

PART 2 - PRODUCTS

2.01 Description.

PART 3 - EXECUTION

3.01 Examination.

3.02 Installation.

3.03 Start-Up Services.

3.04 Manufacturer's Field Services.

3.05 Training Services.

SECTION 16920 - CONTROL PANELS

PART 1 - GENERAL

1.01 General Requirements.

PART 2 - EXECUTION

Not Applicable.

PART 3 - EXECUTION

3.01 Assembly.

3.02 Installation.

3.03 Cleaning.

3.04 Examination.

3.05 Delivery, Storage & Handling.

SECTION 16010

BASIC ELECTRICAL REQUIREMENTS

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Basic electrical requirements specifically applicable to Division 16.

1.02 SCOPE

- A. All work included in this division and its sections is coordinated with and complementary to all the requirements and conditions set forth in other divisions and sections of the specifications, and associated drawings wherever applicable to the electrical work.
- B. The intent and object of these specifications and drawings is to include a complete wiring system from service entrance to each and every device indicated or specified, including connecting all electrical devices and/or equipment furnished by the OWNER or other CONTRACTORS.

1.03 GENERAL REQUIREMENTS

- A. The work covered by this division of the specification is a separate contract and includes the furnishing of all labor, materials, tools, transportation, permits, certificates, temporary protection and storage required to complete the electrical work.
- B. Wherever the words "the Electrical CONTRACTOR", "CONTRACTOR" or "this CONTRACTOR" appear in this division of these specifications, they apply specifically to the Electrical CONTRACTOR.
- C. The CONTRACTOR shall read the entire specification. The CONTRACTOR shall also thoroughly examine all the project plans and the proposed construction site.
- D. It shall be the Electrical CONTRACTOR's responsibility to notify other CONTRACTORS to arrange clearances and access openings for all large electrical equipment.
- E. Electrical equipment delivered to the job site sectionalized for shipping purposes shall be assembled according to manufacturer's instructions. This shall include interconnecting bus work, and all other wiring and removal of bracing and supports installed to safeguard devices during shipment.
- F. The Electrical CONTRACTOR shall be responsible for unloading, placing into storage, if necessary, removal from storage, and setting in place, all equipment and material required for completion of the electrical installation.
- G. Where material substitutions have been accepted by the ENGINEER and it is later found that material substitutions alter the design or space requirements indicated on the drawings or in the specifications, the Electrical CONTRACTOR shall be responsible for the cost involved to revise the design and construction including the cost of all allied trades involved.

1.04 REGULATORY REQUIREMENTS

- A. All work under this division shall conform to the latest edition of the following codes and regulatory requirements.
 - 1. ANSI/NFPA-70 - National Electrical Code.
 - 2. ANSI/NFPA-101 - Life Safety Code.
 - 3. ANSI C-2 - National Electrical Safety Code.

4. "Safety Standards for Electrical Systems" as contained in the Code of Federal Regulations Title 29, Part 1910, Subpart S-Electrical.
 5. Applicable State Electrical Code.
 6. Applicable Local Electrical Code.
 7. Applicable State and Local Building Codes.
- B. The Electrical CONTRACTOR shall not assume that any drawing or specification forming a part of the contract documents authorizes the violation of any Code, regulation or standard. Where conflicts arise, it shall be deemed that the CONTRACTOR has estimated the cost of all work to be completed in accord with the prevailing Code.
- C. The Electrical CONTRACTOR shall be licensed to perform electrical work in the jurisdiction in which the project is located.
- D. The CONTRACTOR shall obtain all necessary permits for electrical work. Any required fees and sales or use taxes applicable to this branch of work shall be paid by the Electrical CONTRACTOR.
- E. Upon completion of the work, the CONTRACTOR shall deliver to the OWNER all required certificates of inspection and approval.

1.05 DRAWINGS & SPECIFICATIONS

- A. The drawings, which constitute a part of the contract, are diagrammatic in nature and indicate the general arrangement of circuits and outlets, location of switches, panel board and other work; but accuracy is not guaranteed, and field verification of all locations and dimensions is directed.
- B. The drawings will not show all structural and installation details. It shall be the responsibility of the CONTRACTOR to make a complete and satisfactory installation in accordance with the best modern practice and methods.
- C. CONTRACTOR shall be responsible for all dimensions required for laying-out and installing the work. Any information involving accurate measurements of the building shall be taken from the architectural and structural drawings, or at the building.
- D. Generally, outlets shall be located, as required, for proper installation of equipment or to meet Code requirements. Locations of equipment required to be wired shall be coordinated with CONTRACTORS of other trades. The CONTRACTOR shall consult the ENGINEER and refer to all details, sections, elevations and equipment plans and the plans of other trades for exact location.
- E. The ENGINEER reserves the right to make reasonable changes in the location of outlets, apparatus or equipment up to the time of roughing-in. Such changes as directed shall be made by the CONTRACTOR without additional compensation.

1.06 SEQUENCING & SCHEDULING

- A. Construct work in sequence.

1.07 SUBMITTALS

- A. Shop Drawing Submittals:
1. Include products specified in Division 16.
 2. Group submittal data of related systems, products and accessories into a single submittal.

3. Submit shop drawings in brochure form; provide an index sheet referencing all items included.
4. ENGINEER's review of manufacturer's drawings constitutes acceptance of general design only, and will not release the CONTRACTOR from fulfilling the terms and intent of the plans and specifications.

1.08 TEMPORARY POWER

- A. Provide temporary power under provisions of Division 16, Section 16020.

1.09 RECORD DOCUMENTS

A. Scope:

1. It is the intent of this section that all wiring systems included in the project be fully documented. Record documents shall include all electrical devices and equipment furnished by the Electrical CONTRACTOR, other CONTRACTORS and the OWNER. Such documentation shall consist of "record drawings".

B. Record Drawings

1. Record drawings shall consist of marked-up plans and shall contain the following information:
 - a. Conduit routing for conduits 1-inch and larger.
 - b. Location of:
 - 1) Large pull boxes and junction boxes (8-inches and larger).
 - 2) Equipment enclosures.
 - 3) Light switches and receptacles.
 - 4) Control stations.
 - 5) Equipment shown on the plan sheets.
 - 6) Information as specified elsewhere in this division.
2. CONTRACTOR shall also document the electrical work on drawings obtained from other sources.
 - a. Provide drawings of equipment furnished by this CONTRACTOR or other Contractors, which may be found on door panels or within instruction manuals shipped with the equipment. CONTRACTOR shall mark up such drawings to reflect any changes made as part of the electrical work.
 - b. Provide documentation of modifications that may have been made to electrical equipment by manufacturer's representatives or start-up personnel. It shall be the responsibility of the CONTRACTOR to obtain a copy of such changes, and include that information with the record documentation.
 - c. CONTRACTOR shall mark up submittal drawings of equipment furnished by this CONTRACTOR or other Contractors to reflect any changes made to the equipment as part of the electrical work.
3. CONTRACTOR shall maintain a copy of the Record Drawings on-site, and keep them up to date to reflect the work completed to date.
4. Prior to final payment, the CONTRACTOR shall submit one (1) complete, clear, concise and clean set of marked-up prints.

1.10 GUARANTEES

- A. Provide guarantees, warranties and bonds.
- B. CONTRACTOR shall leave the entire electrical system in good working order and shall, at their expense, repair, rebuild, remodel and make good and acceptable all defective labor and materials that may develop within 1-year after completion and final acceptance of the work hereunder and as further described under "General Conditions of the Construction Contract".
- C. It may be necessary to energize portions of the electrical system prior to final acceptance of the complete work. It is the intent of these specifications that the above guarantee period shall be 1-year after final acceptance.

PART 2 - PRODUCTS

2.01 MATERIALS & EQUIPMENT

- A. All materials used for the electrical installation shall be new and unused, except as otherwise indicated, and shall be uniform in type and manufacture for the entire electrical installation.
- B. All materials shall be suitable for the conditions and duties imposed upon them in service and shall be the latest standard catalog products of reputable manufacturers.

2.02 MANUFACTURERS

- A. Manufacturers shall have a minimum 5-years continuous experience in the manufacture of products specified under this section.
- B. Where materials, equipment, apparatus or other products are specified by manufacturer, brand name, type or catalog number, such designation is to establish standards of desired quality and style and shall be the basis of the bid.
- C. Where "Acceptable Manufacturers" are listed, the list is for general acceptance only. Actual product used must conform to plans and specifications and be of equivalent type, function, appearance and quality as the specified manufacturer, brand name, type or catalog number, if so specified. Products used shall be subject to review.

2.03 LISTING OR LABELING

- A. Materials and equipment of the types for which there are National Board of Fire Underwriters (UL) listings and label service, shall be so labeled and shall be used by the CONTRACTOR.
- B. Listed or labeled equipment shall be used or installed in accordance with any instructions included in the listing or labeling.

PART 3 - EXECUTION

3.01 EQUIPMENT WIRING

- A. The Electrical CONTRACTOR shall check the drawings and specifications of all other divisions of work, such as Heating, Ventilating, Air Conditioning, Plumbing, Mechanical Equipment, etc., for equipment and work which must be included in order to provide a complete electrical installation.
- B. Prior to energizing any equipment, the CONTRACTOR shall first make a thorough inspection of it, and remove all packing, braces and shipping supports, and thoroughly vacuum (or blow out with compressed air) all dirt and debris.

- C. All associated starters, motor controls, pilot devices, etc. that may be furnished by others, shall be delivered to the Electrical CONTRACTOR who shall receive, handle, set, mount and install this equipment. Unless stated elsewhere, the Electrical CONTRACTOR shall provide all starters, motor controls, disconnects and pilot devices.
- D. All motor control wiring less than 120-volts associated with heating, ventilating, air conditioning, plumbing and mechanical equipment shall be considered "low voltage wiring" and shall be wired by the Electrical CONTRACTOR, except as may be specified in Division 15. The Electrical CONTRACTOR shall extend and supply power to the primary circuit of associated low voltage control transformers, and shall be responsible for all low voltage wiring associated with building service motors, such as door operators, alarm, instrumentation, etc. Wiring shall be in full compliance with the **drawings** and specifications established under architectural, heating, ventilating and mechanical equipment divisions of the project.
- E. All motor control wiring 120-volts and greater shall be considered "line voltage wiring" and shall be furnished, installed, wired and connected by the Electrical CONTRACTOR, except as may be specified in Division 15.
- F. It shall be the responsibility of the Electrical CONTRACTOR to obtain manufacturer's wiring diagrams of all electrical equipment furnished by other contractors and shall not proceed to wire the equipment without this information.
- G. The Electrical CONTRACTOR shall check all drawings and specifications to determine the requirements for motor disconnect switches. Whether or not specifically indicated on the drawings or in the specifications, the Electrical CONTRACTOR shall be responsible for furnishing motor disconnect switches to conform with regulatory requirements.

3.02 FINAL TESTS & DEMONSTRATIONS

- A. The CONTRACTOR shall test all work and all equipment installed by them, to ensure its proper and safe operation in accordance with the true intent of the drawings and specifications. The CONTRACTOR shall check all interlocking and automatic control sequences, and shall test the operation of all safety and protective devices. The CONTRACTOR shall rectify all defects, shall cooperate in this work with the electric utility, supplier's representatives and all other persons as directed by the OWNER or their representatives, in order to achieve the proper and intended operation of all equipment.
- B. The CONTRACTOR shall test, adjust and record operating voltages, at each system level before energizing branch circuit. This record of operating voltages shall be turned over to the ENGINEER in a typed format. Transformer taps must be adjusted to obtain, as near as possible, nominal system voltage. Where transformer is under utility jurisdiction, obtain services of utility to correct voltage. The CONTRACTOR shall be responsible for replacement of all devices and equipment damaged due to failure to comply with this requirement.
- C. The CONTRACTOR shall balance load among feeder conductors at each panel board, switchboard or substation, and shall reconnect loads, as may be necessary, to obtain a reasonable balance of load on each phase. Electrical unbalance shall not exceed 7½%.
- D. The CONTRACTOR shall provide all instruments and equipment necessary to perform required tests.
- E. All checks and tests shall be permanently recorded and three (3) copies submitted to the ENGINEER in a typed format. The tests shall include:
 - 1. System Grounding.
 - 2. Fuses:

- a. Equipment nameplate requirement.
- b. Actual fuse rating.
- 3. Breakers:
 - a. Nameplate.
 - b. Setting.
- 4. Motors:
 - a. Nameplate.
 - b. Overload relay element.
 - c. Protective relay (if any) setting.
 - d. Voltage and current phase readings.
 - e. Direction of rotation.
- 5. 500-volt Megger check on equipment up to 2,000-volts.
- 6. Ampere readings on any cable operating in parallel to ensure an even division of current.
- 7. Solid-state equipment shall not be Megger checked.
- F. The CONTRACTOR shall upon request demonstrate proper operation of all electrical systems and equipment in the presence of the ENGINEER/ARCHITECT and/or other designated persons.

3.03 START-UP

- A. Start systems.

3.04 CLEANUP & PAINTING

- A. Provide final cleaning.
- B. The Electrical CONTRACTOR shall periodically remove from the site all debris and rubbish accumulating as a result of the electrical installation. Upon completion of the project, shall dispose of all debris and rubbish and shall:
 - 1. Leave electrical equipment rooms broom clean.
 - 2. Clean interior of all panel cabinets, pull boxes and other equipment enclosures.
 - 3. Wash and wipe clean all lighting fixtures, lamps and other electrical equipment that may have become soiled during the installation.
- C. If, during the installation, the finish of any electrical equipment has deteriorated or has been damaged, the Electrical CONTRACTOR shall restore its condition and appearance to the satisfaction of the OWNER.

END OF SECTION

SECTION 16020
TEMPORARY ELECTRICAL

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. Extend a single feeder for temporary construction power from OWNER's existing distribution facilities.
- B. Provide and maintain separate temporary power panelboards, transformers (where required), receptacles, fixtures and lamps.
- C. Provide 120-volt outlets and lighting for all trades to execute their work. Any CONTRACTOR requiring greater than 20-ampere, 1-phase circuits, different voltages or any 3-phase circuits, shall arrange and pay for each special wiring condition.

1.02 REGULATORY REQUIREMENTS

- A. Conform to OSHA regulations in providing temporary power and lighting.
- B. Conform to National Electrical Code, Article 527, "Temporary Installations".

PART 2 - PRODUCTS

Not Applicable.

PART 3 - EXECUTION

2.01 INSTALLATION

- A. Verify and coordinate provisions for temporary power with the OWNER and other CONTRACTORS. Avoid obstructing corridors and other areas. Install temporary wiring in a manner not to create hazardous situations.
- B. Provide temporary circuits and outlets, in a timely manner, to allow for the safe use of power by other trades.
- C. Provide temporary lighting, in a timely manner, sufficient to:
 - 1. Enable all trades to safely complete their work.
 - 2. Enable the ENGINEER and their On-Site Representative to safely observe all work.
- D. Equip all temporary electrical circuits for construction purposes with combination ground fault circuit interrupter and circuit breakers meeting the requirements of Underwriter's Laboratories (UL) for Class A, Group 1 devices.
- E. Do not energize and use permanent facilities until all system grounding has been properly and permanently installed and tested.

END OF SECTION

SECTION 16195
ELECTRICAL IDENTIFICATION

PART 1 - GENERAL

Not Applicable.

PART 2 - PRODUCTS

2.01 NAMEPLATES & LABELS

- A. Nameplates: Engraved three-layer laminated plastic, black letters on white background.
- B. Locations:
 - 1. Each electrical distribution and control equipment enclosure.
 - 2. Local disconnect switches.
 - 3. Local control stations.
 - 4. Communication cabinets.
- C. Letter Size:
 - 1. Use 3/16-inch letters for identifying individual equipment and loads.
 - 2. Use 1/4-inch letters for identifying grouped equipment and loads.
- D. Legend:
 - 1. Equipment Tag No.
 - 2. Equipment description.
- E. Labels:
 - 1. Machine printed on silver-finished B-969 metalized or White B-619 polyester with clear over-laminate Brady Perma-Shield or equal. Use for identification on individual wall switches and receptacle. Use on control stations, only if a nameplate is not specified.
- F. Furnish and install any signage required by the NEC.
- G. Submit complete list of nameplate wording prior to engraving.

2.02 WIRE MARKERS

- A. Wire markers shall be self-laminating, adhesive, wrap-around, machine-printed labels, similar to those made using the "Bradywriter III" Industrial Printing System.
- B. Locations: Each conductor at panel board gutters, outlet and junction boxes and each load connection.
- C. Legend:
 - 1. Power & Lighting Circuits: Panel designation and branch circuit or feeder numbers.

- 2. Control Circuits: Control wire number indicated on shop drawings or control drawings.
- 3. Shielded Cables: Cable number indicated on shop drawings or control drawings.
- D. Wire markers shall be applied such that the wire number is facing outward and right-side up.

2.03 CONDUIT & WIREWAY MARKERS

- A. Conduit markers shall be vinyl cloth, black on orange, Brady Type "CV", or equivalent.
- B. Conduit numbering labels shall be self-laminating, Brady DATAB or equal.
- C. Location: Furnish markers for each conduit and wireway longer than 6-feet.
- D. Spacing: Affix labels at each end of conduit and where it enters and/or exits walls and floors.

2.04 LAMINATED TAGS

- A. Furnish and install laminated tags identifying all instruments and valves that are wired by the Electrical CONTRACTOR.
- B. Legend shall be same as identification on P&I drawings.

2.05 MOTOR LABELS

- A. Machine printed on silver-finished B-969 metalized polyester film with clear polyester over-laminate, Brady Perma-Shield or equal.
- B. Motor label shall have motor number and description as listed on the drawings.

PART 3 - EXECUTION

3.01 PREPARATION

- A. De-grease and clean surfaces to receive nameplates and labels.

3.02 APPLICATION

- A. Install nameplate and label parallel to equipment lines.
- B. Secure nameplate to equipment front using screws or adhesive.
- C. Secure nameplate to inside surface of door on panel board that is recessed in finished locations.
- D. Identify underground conduits and cables using underground warning tape. Install one (1) tape per trench at 6-inches below finished grade (unless otherwise noted on the plans).

END OF SECTION

SECTION 16483

VARIABLE FREQUENCY DRIVES

PART 1 - GENERAL

1.01 SCOPE

- A. CONTRACTOR shall install and wire complete, five (5) Variable Frequency Drives (VFD's) supply by OWNER.

PART 2 - PRODUCTS

2.01 DESCRIPTION

- A. This section describes the requirements for a microprocessor-based packaged AC drive that provides a Pulse Width Modulated (PWM) adjustable frequency and voltage output for control of motor speed and torque.
- B. Project-specific ratings and features:
 - 1. Motor HP: As indicated on drawings.
 - 2. Continuous Output Amps: NEC FLA (min.), normal duty.
 - 3. Human Interface Module: LCD display, full numeric keypad, door-mounted.
 - 4. Controls devices and operators: As indicated on drawings.
 - 5. Enclosure: MCC Construction. Refer to MCC requirements.
 - 6. Disconnect switch.
 - 7. Drive fusing.
 - 8. Input line reactor, 3%.
 - 9. Common mode choke, either integral to the drive or mounted and wired separately in the drive enclosure.
 - 10. Discrete control inputs/outputs.
 - 11. One 4-20 mA input, one 4-20 mA output.
- C. Manufacturer & Model:
 - 1. Base Specification: Siemens.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify that surface is suitable for drive installation.
- B. Do not install drive until building environment can be maintained within the service conditions required by the manufacturer.

3.02 INSTALLATION

- A. Unload equipment under supervision of supplier's representative.
- B. Set equipment in place. Install equipment where indicated, in accordance with manufacturer's written instructions.
- C. Tighten accessible connections and mechanical fasteners after placing controller.
- D. Provide neatly typed label inside each VFD controller door identifying motor served, nameplate horsepower, full load amperes, code letter, service factor, and voltage/ phase rating.

3.03 START-UP SERVICES

- A. Start-up services by others.
- B. Coordinate with and assist manufacturer's field personnel in equipment start-up activities.

3.04 MANUFACTURER's FIELD SERVICES

- A. Provide the services of a factory-trained representative to provide on-site inspection and start-up services for each drive installed.
- B. Manufacturer's services shall include:
 - 1. Inspect equipment installation.
 - 2. Inspect field power wiring.
 - 3. Inspect grounding.
 - 4. Verify proper operation of all functions.
 - 5. Adjust parameters, as required, for application. Document parameters.
 - 6. Provide site report, documenting problems observed and actions taken.

3.05 TRAINING SERVICES

- A. Services of a factory-trained, authorized, representative to provide on-site training for OWNER personnel by others.

END OF SECTION

SECTION 16920

CONTROL PANELS

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

- A. The CONTRACTOR shall install three (3) Programmable Logic Controllers (PLC's), supply by OWNER.
- B. The CONTRACTOR shall install the control panel(s), including all field wiring. The panels shall be wired complete.

PART 2 - PRODUCTS

Not Applicable.

PART 3 - EXECUTION

3.01 ASSEMBLY

- A. Control panel shall be furnished to the site completely assembled.

3.02 INSTALLATION

- A. Install control panel as shown on the drawings.
- B. Wire all field devices, power and communication cables to the control panel to form a complete operating control system.
- C. CONTRACTOR is responsible for obtaining wiring and testing information for devices that are required to be wired to the control panel, whether supplied by them or by others.
- D. Coordinate and assist panel supplier field personnel in controls and equipment start-up.

3.03 CLEANING

- A. Clean electrical parts to remove conductive and deleterious materials.
- B. Remove dirt and debris from enclosure.
- C. Clean finishes and touch-up damage.

3.04 EXAMINATION

- A. Verify that surface is suitable for control panel installation.
- B. Do not install control panel until building and environmental can be maintained within the service conditions of the enclosure.

3.05 DELIVERY, STORAGE & HANDLING

- A. Receive, store, protect and handle products to site.
- B. Store in a clean, dry space. Maintain protective wrapping or provide an additional heavy canvas or heavy plastic cover to protect units from dirt, water, construction debris and traffic.

- C. Handle in accordance with NEMA ICS 2.3. Lift only with lugs provided for the purpose. Handle carefully, avoid damage to components, enclosure and finish.
- D. Wire field devices and power to control panels for a complete operating control system.

END OF SECTION



Voith Paper

Voith Paper Inc.
2200 N. Roemer Road (54911)
P.O. Box 2337
Appleton, WI 54912-2337 USA
Telephone: (920) 731-7724
Fax: (920) 731-0240
www.voithpaper.com

January 29, 2007

Stephen Lea
Oconto Falls Tissue Co.
Oconto Falls Mill
106 East Central Avenue
Oconto Falls, WI 54154

**Reference: Voith Paper Proposal 092-FS07-9376-00
210 ADSTPD Deink Plant Upgrade**

Dear Mr. Lea:

Referring to your inquiry, we are pleased to offer for your consideration our proposal for the equipment referenced above.

Complete specifications including operating data, features and preliminary dimensional data are provided in the enclosed proposal.

We appreciate your continued interest in the products and services of Voith Paper Inc. and look forward to working with you on this project. If you have any questions or require additional information, please call me at (920) 731-7724 ext. 2411.

Regards,

A handwritten signature in black ink that reads "Chris Laska".

Chris Laska
Application Engineer

CBL/sjf

Enclosures

cc: Dave Brezko, Oconto Falls Tissue Mill, Oconto Falls, WI
Larry Moreland, Regional Sales Manager – Midwest

Quotation prepared by Chris Laska, Application Engineer at (920) 731-7724



Voith Paper

Voith Paper Inc.
2200 N. Roemer Road (54911)
P.O. Box 2337
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www.voithpaper.com

Oconto Falls Tissue Co.
106 East Central Avenue
Oconto Falls, WI 54154

Our reference: C. Laska
Telephone Extension: 2411
Telefax Extension: 2848
Date: 2007-01-29
e-mail: chris.laska
@voith.com

Proposal

Codeword **Oconto Falls**

Proposal No. **092-FS07-9376-00**

Subject to our General Conditions of Sale, we quote as follows:

210 ADSTPD Deink Plant Upgrade

Voith Paper Inc.

Oconto Falls
092-FS07-9376-00

Table of Contents
Section 0
Page 1

Table of Contents

1	Commercial Section
2	Technical Introduction
3	Equipment Specifications – 210 TPD System Upgrade
4	Alternates – 150 TPD System Upgrade
5	Services
6	Supply Standards and Limits
7	Consumption Data
8	Exhibits



Voith Paper

Our reference: C. Laska
Tel. Extension: 2411
Date: 2007-01-29
e-mail: chris.laska
@voith.com

Commercial Section

Codeword	Oconto Falls
Proposal No.	092-FS07-9376-00
Section	1

Oconto Falls
092-FS07-9376-00

Commercial Section
Section 1
Page 1

Table of Contents

1	Commercial Section
1.1	Schedule of Prices
1.2	Commercial Comments

Oconto Falls
092-FS07-9376-00

Commercial Section
Section 1
Page 2

Section 1.1

Schedule of Prices

3.0 Qty. Equipment – 210 TPD System Upgrade

3.1	1	Blade Rotor 316L HD.S 32
3.2	2	High Density Cleaner, Model HDC 12-850
3.3	1	MultiSorter, Model MSM 05/05-LR
3.4	1	Celleco 350 to EcoMizer Retrofit
3.5	1	MultiScreen, Model MSS 12/12
3.6	1	MultiScreen, Model MSS 06/06
3.7	1	Centrisorter, Model ST 400 Retrofit
3.8	1	Compact Washer, Model CW2500
3.9	1	Thune Screw Press, Model SP70L SH
3.10	1	Equalizing Screw Conveyor, Model SEG250S-500.4500
3.11	1	High Temperature Disperger, Model HTD250ED
3.12	1	EcoCell Flotation System
3.13	1	KS 60 Cleaner System with EcoMizer – 2 Stage
3.14	1	Conus Trenner, CT 220

Total USD 2,422,070

4.0 Qty. Alternates – 150 TPD System Upgrade

4.1	1	High Density Cleaner, Model HDC 12-1200
4.2	1	MultiSorter, Model MSM 05/05-LR
4.3	1	Celleco 350 to EcoMizer Retrofit
4.4	1	MultiScreen, Model MSS 10/10
4.5	1	MultiScreen, Model MSS 06/06
4.6	1	Centrisorter, Model ST 400 Retrofit
4.7	1	Compact Washer, Model CW2000
4.8	1	Thune Screw Press, Model SP70L SH
4.9	1	EcoCell Flotation System
4.10	1	KS 60 Cleaner System with EcoMizer – 1 Stage
4.11	1	Conus Trenner, CT 150

Total USD 1,695,710

Oconto Falls
092-FS07-9376-00

Commercial Section
Section 1
Page 3

Section 1.2

Commercial Comments

Conditions of Sale

Our Proposal is based on Voith General Terms and Conditions, which are enclosed.

Prices for Equipment

All prices are quoted in United States Dollars and are FCA Appleton, WI or FCA US Port of Entry. Prices exclude taxes per our General Terms and Conditions.

Terms of Payment

- 15% down payment with order, due upon receipt of invoice.
- 25% payment upon receipt of Voith Paper preliminary drawings for approval, due upon receipt of invoice.
- 20% upon receipt of Voith Paper certified drawings, due upon receipt of invoice.
- 40% final payment due 30 days after Voith Paper shipment of goods and customer's receipt of final invoice.

Validity

Quoted prices are valid until March 1, 2007.

Shipping Date

Based on present conditions, the ship date for the equipment offered is approximately 30 weeks after receipt of an order and clarification of all technical and commercial details.



Voith Paper

Our reference: C. Laska
Tel. Extension: 2411
Date: 2007-01-29
e-mail: chris.laska
@voith.com

Technical Introduction

Codeword	Oconto Falls
Proposal No.	092-FS07-9376-00
Section	2

Oconto Falls
092-FS07-9376-00

Technical Introduction
Section 2
Page 1

Table of Contents

2	Technical Introduction
2.1	Technical Comments
2.2	Mass Flow Balances

Oconto Falls
092-FS07-9376-00

Technical Introduction
Section 2
Page 2

Section 2.1

Technical Comments

Based on Voith's walk through your system, we have provided two options to upgrade your current deinking production up to 210 ADSTPD. The first option will be the upgrade of your current deink plant to the full 210 ADSTPD production without the assistance of the "mini system". Option 2 utilizes the "mini system" to provide 60 ADSTPD of stock to the final production, thus the main line deink plant for this option has been upgraded to produce 150 ADSTPD of deink pulp.

Option #1 (210 ADSTPD)

Pulping

The existing HDC 32 pulper currently in use at the mill will be slightly under sized for the required production. To eliminate this bottleneck Voith proposes the upgrade the current HD rotor in this pulper to a new HDS 32 rotor. The HDS rotor has a cupped periphery ring of flitelets. This modification allows the pulper to run up to 18% consistency therefore increasing the production. The quoted upgrade is for an entirely new HDS Rotor. If the existing pulper rotor is in excellent condition it may be retrofitted to the HDS style for a significant cost savings. The remainder of the pulping system (Contaminex, Model CMS 40 and Drum Screen, Model 5) will remain unchanged.

Coarse Cleaning

The coarse cleaning module has been changed to include two new Voith HDC 12"-850 sized cleaners. This new cleaner system will replace the current 17" HD cleaner.

Coarse Screening

The coarse screening module will require a new primary screen while utilizing existing units in the secondary and tertiary stages. A new MultiSorter, Model MSM 05/05 with 0.055" Holes and a Lobed Rotor will be placed at the primary position. The secondary position will be handled by two existing ST-100 screens. These units should also contain similarly sized hole baskets. The module is rounded off with the existing Rejectsorter, Model RS2C.

Forward Cleaning

The existing Celleco CleanPac 370 cleaner system will be retrofitted with Voith's EcoMizer Technology in three fully cascaded stages. The EcoMizer retrofits will allow the current cleaners to run at higher consistencies while improving quality. The higher operational consistency also allows for greater production from the module. For longevity, Voith has proposed nylon retrofit assemblies in the primary and secondary stages and a ceramic version in the tertiary stage.

Fine Screening

The fine screening module will also require some significant upgrades to ensure quality deink pulp production. The primary stage will be outfitted with a new MultiScreen, Model MSS 12/12 fitted with 0.15 mm C-barSQ slots. The secondary screen will also be new, in

Oconto Falls
092-FS07-9376-00

Technical Introduction
Section 2
Page 3

this case it will be a MultiScreen, MSS 06/06 with 0.15 mm C-barSQ slots. The tertiary stage will utilize an existing ST 400 screen, however, it must be fitted with a new 0.15 mm C-barSQ basket, amend as shown in the next page.

Stock Washing

Currently the mill is using a DNT 200 as the stock washing module. In the upgraded system the existing DNT 200 will be operating in parallel with a new Compact Washer, Model CW2500.

Dispersion

The dispersion module will be entirely replaced with new equipment beginning with a new Thune Screw Press, Model SP70L. This press will thicken the stock to a minimum of 30% prior to dispersion. The actual dispersion will take place in a new High Temperature Disperger, Model HTD250ED which will provide 4.5 hpd/t to the stock. This disperger has an integrated heating section, thus eliminating the need for an expensive and real estate intensive heating screw.

Flotation

Flotation will be relocated and supplemented with new cells to provide the best possible effect with mostly existing equipment. To start the flotation will be relocated to the post dispersion position. In the new arrangement the primary stage will consist of all existing units. The existing CF3C-F cell will make up one bank. The second primary bank will be made up of the existing CF2B and CF2S cells. The rejects from these parallel primaries will then be fed to a new bank of EcoCell Secondary cells. This new secondary stage will be comprised of two size 2/38 cells, with the appropriate pumps. To deaerate the primary rejects prior to the secondary cells an EZM 600B-11.6 is provided.

Ultra Fine Cleaning

Flotation accepts will be fed to the ultra fine cleaning module. This module will be made up of new and existing cleaners. The primary and secondary stages will utilize new KS-60 Cleaners with EcoMizer technology. These cleaners will effectively lower micro dirt concentration while maintaining yield with the EcoMizer technology. The tertiary stage will employ existing Clean Pac 270 units.

DSM Washing

After ultra fine cleaning the deink stock will flow through the existing DSM screens for thickening. These units will likely be adequately sized for the new production however this must be verified with the original equipment manufacturer. The thickened accepts will be sent to the Twin Wire Press. The DSM filtrate will be sent to a fiber scalping Conus Trenner.

Fiber Scalping

For fiber recovery on the DSM filtrate Voith is proposing the use of a Conus Trenner. The Conus Trenner will separate the stock into a coarse and fine fraction. The coarse fraction will be returned to the system via dilution sources. The fine fraction will be sent to the system DAF for removal.

Wire Press

The current wire press is in need of repair to bring its capacity back up to original levels. The existing unit should be sufficient for the required upgrade production, however, this must be confirmed by the original equipment manufacturer.

Oconto Falls
092-FS07-9376-00

Technical Introduction
Section 2
Page 4

Option #2 (150 ADTPD)

Pulping

The existing HDC 32 pulper and its periphery equipment currently in use at the mill will be will be adequate for the required production.

Coarse Cleaning

The coarse cleaning module has been changed to include one new Voith HDC 12"-1200 sized cleaner. This new cleaner system will replace the current 17" HD cleaner.

Coarse Screening

The coarse screening module will require a new primary screen while utilizing existing units in the secondary and tertiary stages. A new MultiSorter, Model MSM 05/05 with 0.055" Holes and a Lobed Rotor will be placed at the primary position. The secondary position will be handled by one existing ST-100 screen. This unit should also contain a similarly sized hole basket. The module is rounded off with the existing Rejectsorter, Model RS2C.

Forward Cleaning

The existing Cellico CleanPac 370 cleaner system will be retrofitted with Voith's EcoMizer Technology in three fully cascaded stages. The EcoMizer retrofits will allow the current cleaners to run at higher consistencies while improving quality. The higher operational consistency also allows for greater production from the module. For longevity, Voith has proposed nylon retrofit assemblies in the primary and secondary stages and a ceramic version in the tertiary stage.

Fine Screening

The fine screening module will also require some significant upgrades to ensure quality deink pulp production. The primary stage will be outfitted with a new MultiScreen, Model MSS 10/10 fitted with 0.15 mm C-barSQ slots. The secondary screen will also be new, in this case it will be a MultiScreen, MSS 06/06 with 0.15 mm C-barSQ slots. The tertiary stage will utilize an existing ST 400 screen, however, it must be fitted with a new 0.15 mm C-barSQ basket, MultiFoil Rotor and Fiber Loop rejects recirculation system.

Stock Washing

Currently the mill is using a DNT 200 as the stock washing module. In the upgraded system the existing DNT 200 will be operating in parallel with a new Compact Washer, Model CW2000.

Dispersion

The dispersion module will be entirely replaced with new equipment beginning with a new Thune Screw Press, Model SP70L. This press will thicken the stock to a minimum of 30% prior to dispersion. The actual dispersion will take place in the existing CR 66 disperger.

Flotation

Flotation will be relocated and supplemented with new cells to provide the best possible effect with mostly existing equipment. To start the flotation will be relocated to the post dispersion position. In the new arrangement the primary stage will consist of all existing units. The existing CF3C-F cell will make up one bank. The second primary bank will be made up of the existing CF2B and CF2S cells. The rejects from these parallel primaries will then be fed to a new bank of EcoCell Secondary cells. This new secondary stage will be

Oconto Falls
092-FS07-9376-00

Technical Introduction
Section 2
Page 5

comprised of two size 1/38 cells, with the appropriate pumps. To deaerate the primary rejects prior to the secondary cells an EZM 600B-11.6 is provided.

Ultra Fine Cleaning

Flotation accepts will be fed to the ultra fine cleaning module. This module will be made up of new and existing cleaners. The primary and secondary stages will utilize new KS-60 Cleaners with EcoMizer technology. These cleaners will effectively lower micro dirt concentration while maintaining yield with the EcoMizer technology. The tertiary stage will employ existing Clean Pac 270 units.

DSM Washing

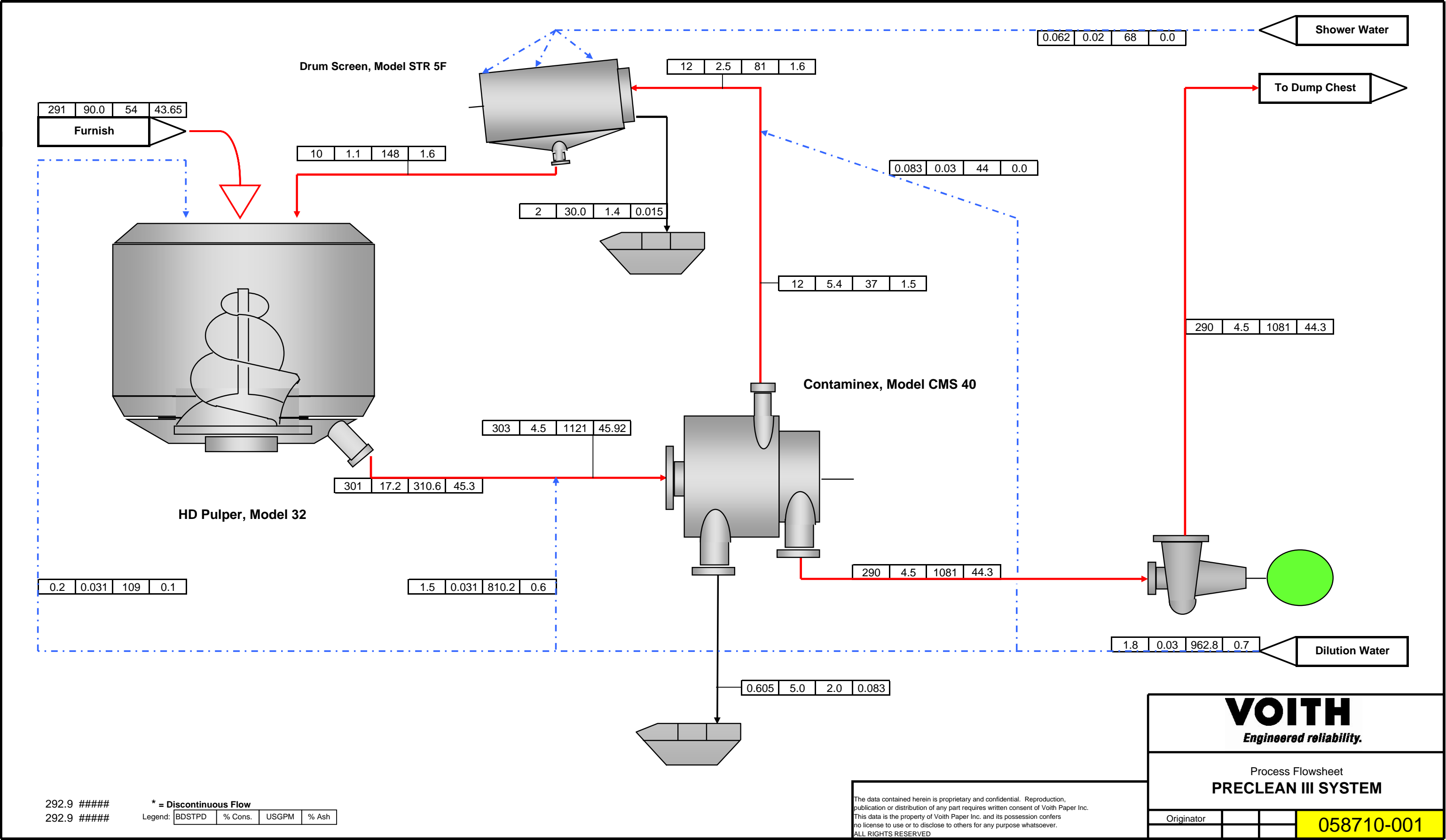
After ultra fine cleaning the deink stock will flow through the existing DSM screens for thickening. These units will likely be adequately sized for the new production however this must be verified with the original equipment manufacturer. The thickened accepts will be sent to the Twin Wire Press. The DSM filtrate will be sent to a fiber scalping Conus Trenner.

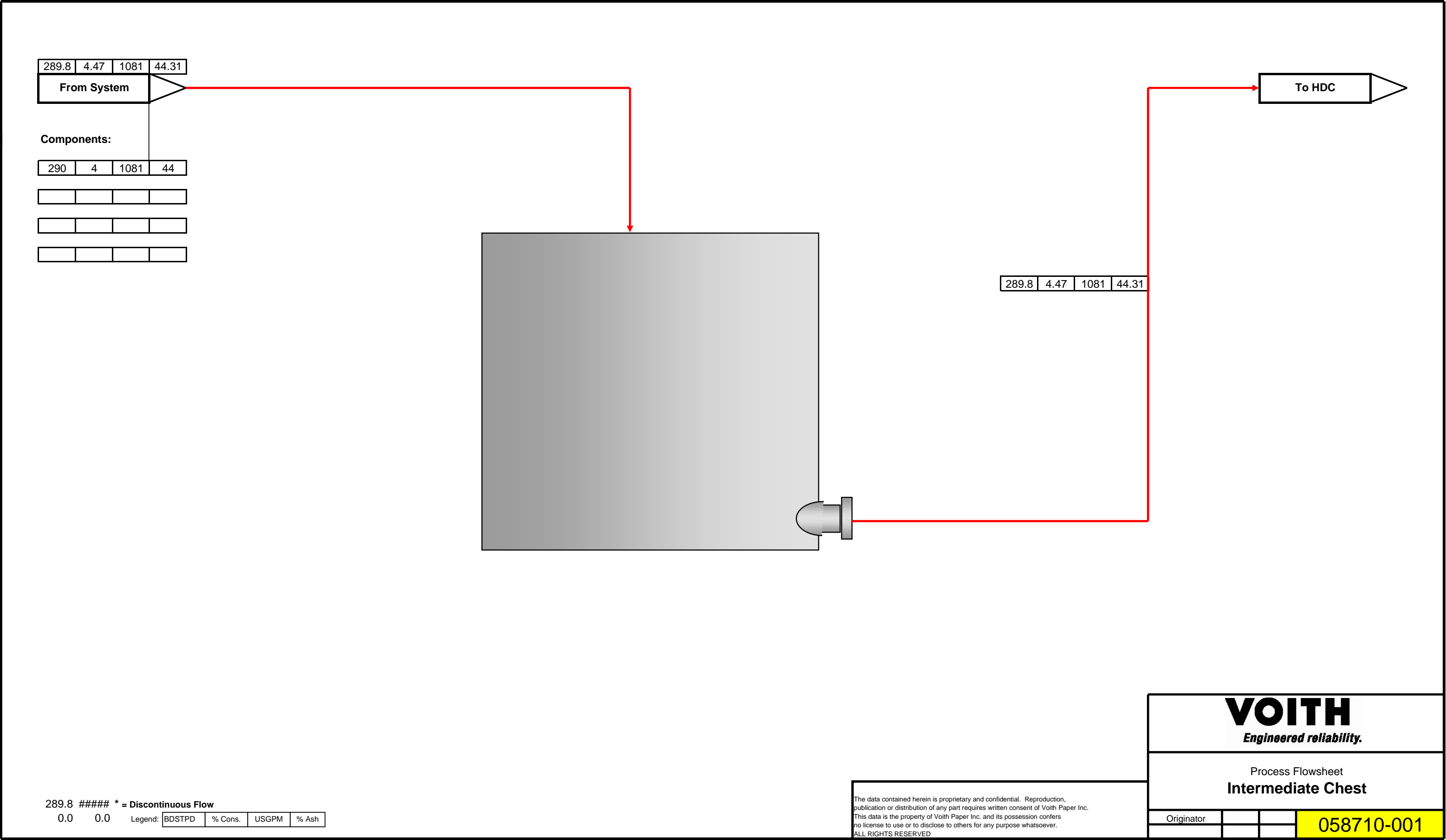
Fiber Scalping

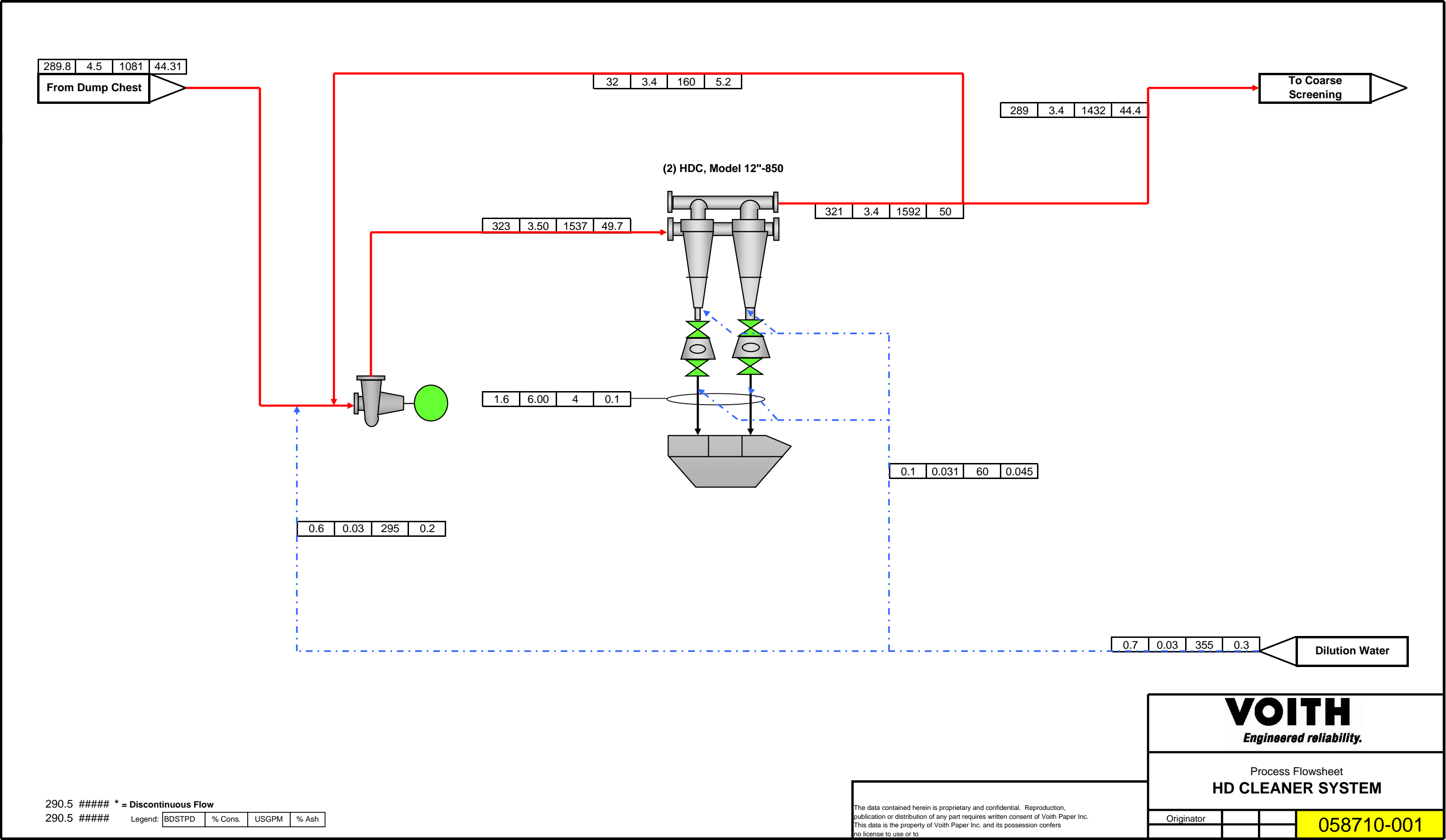
For fiber recovery on the DSM filtrate Voith is proposing the use of a Conus Trenner. The Conus Trenner will separate the stock into a coarse and fine fraction. The coarse fraction will be returned to the system via dilution sources. The fine fraction will be sent to the system DAF for removal.

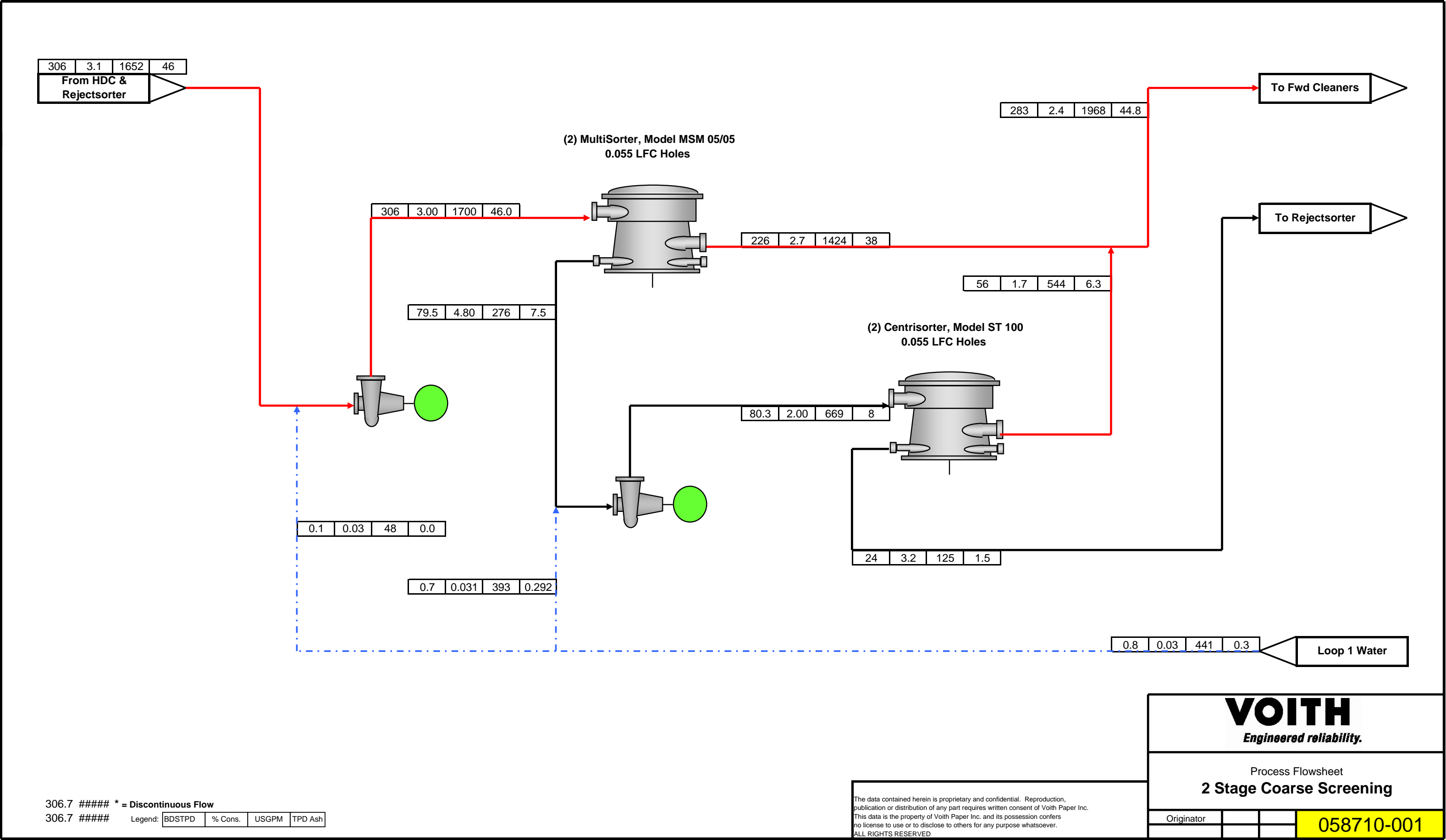
Wire Press

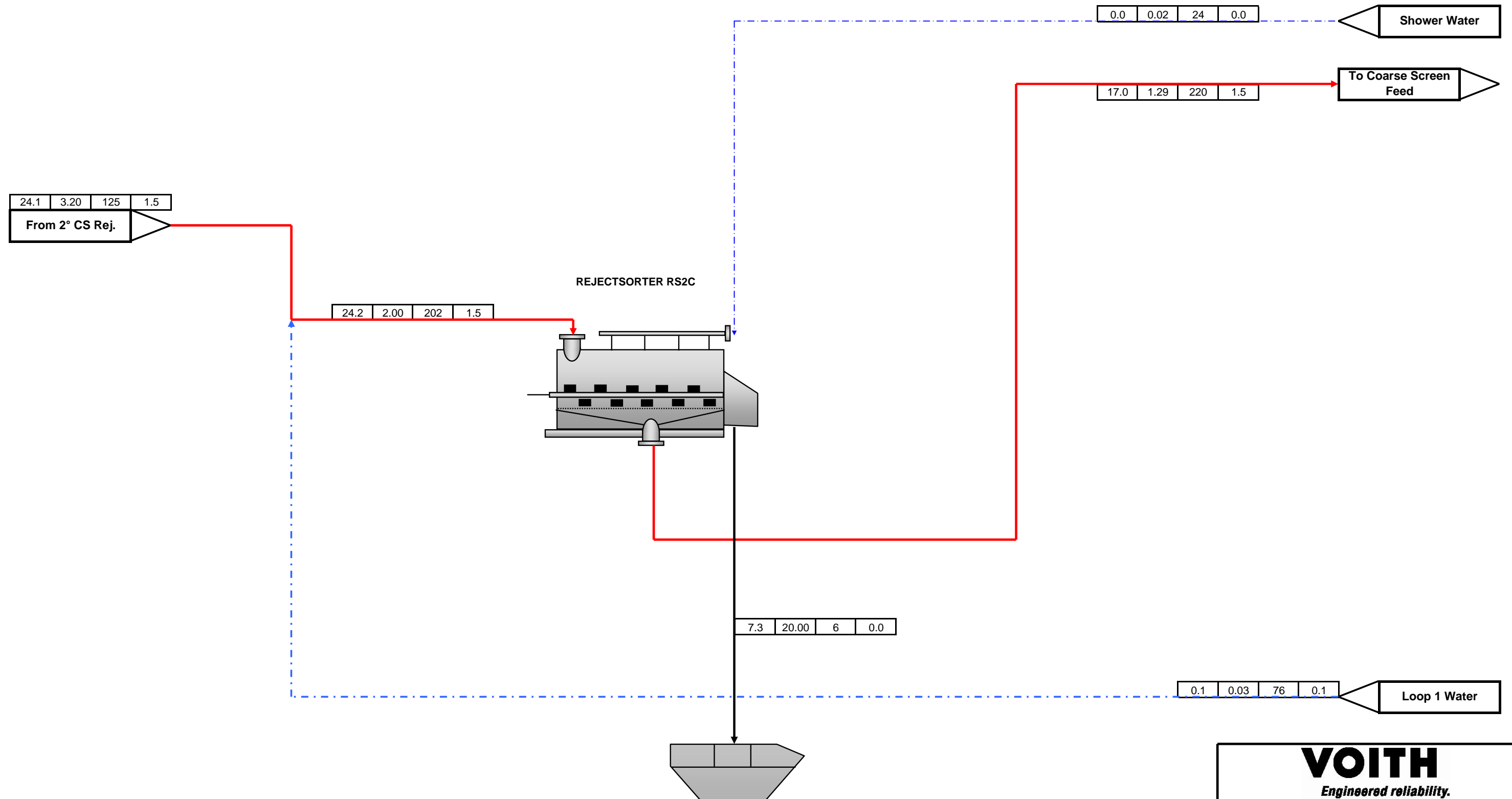
The current wire press is in need of repair to bring its capacity back up to original levels. The existing unit should be sufficient for the required upgrade production, however, this must be confirmed by the original equipment manufacturer.











24.3 226.0 * = Discontinuous Flow

24.3 226.0 Legend: BDSTPD % Cons. USGPM % Ash

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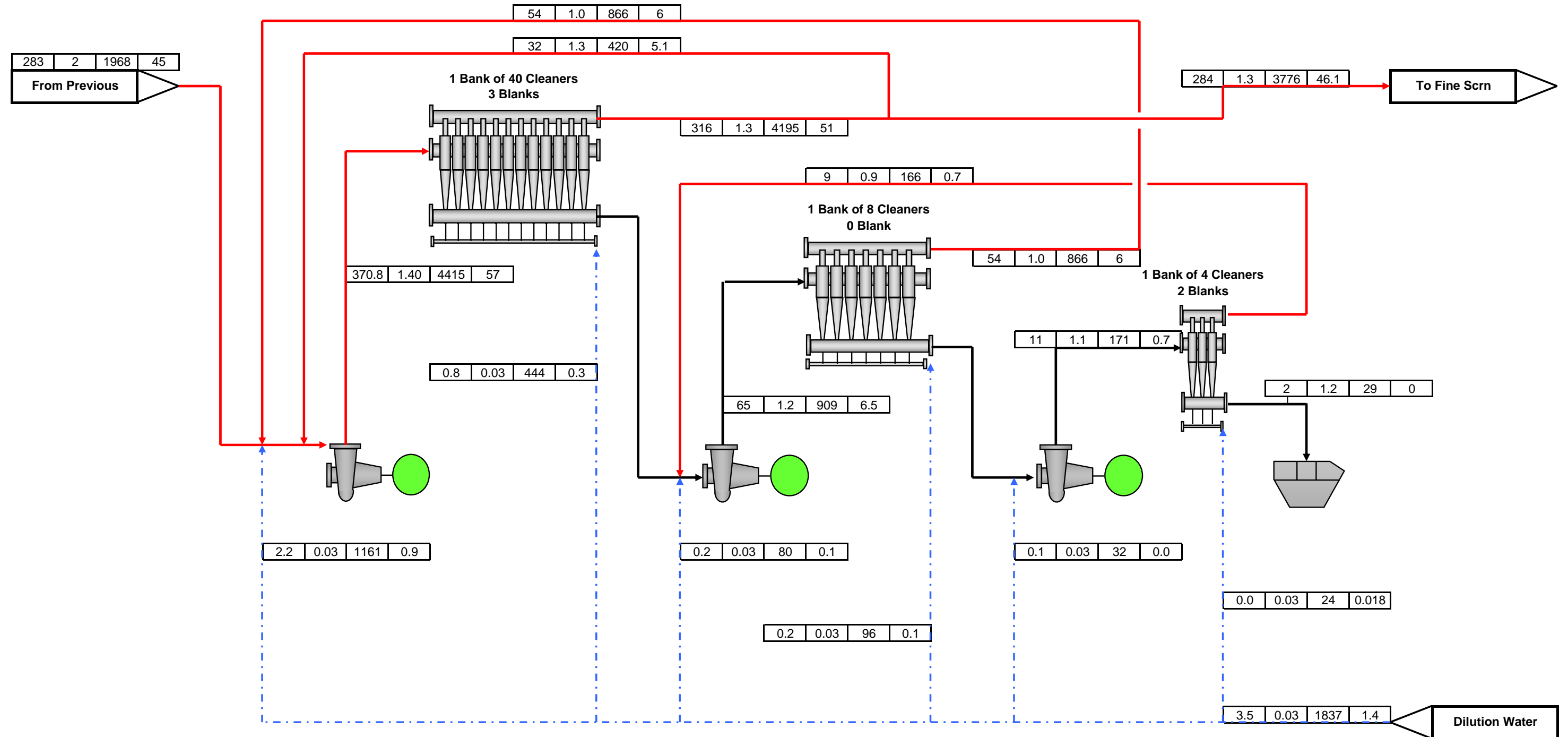
VOITH
Engineered reliability.

Process Flowsheet

Rejectsorter RS2C

Originator

058710-001



286.1 ##### * = Discontinuous Flow

286.1 ##### Legend: BDSTPD % Cons. USGPM % Ash

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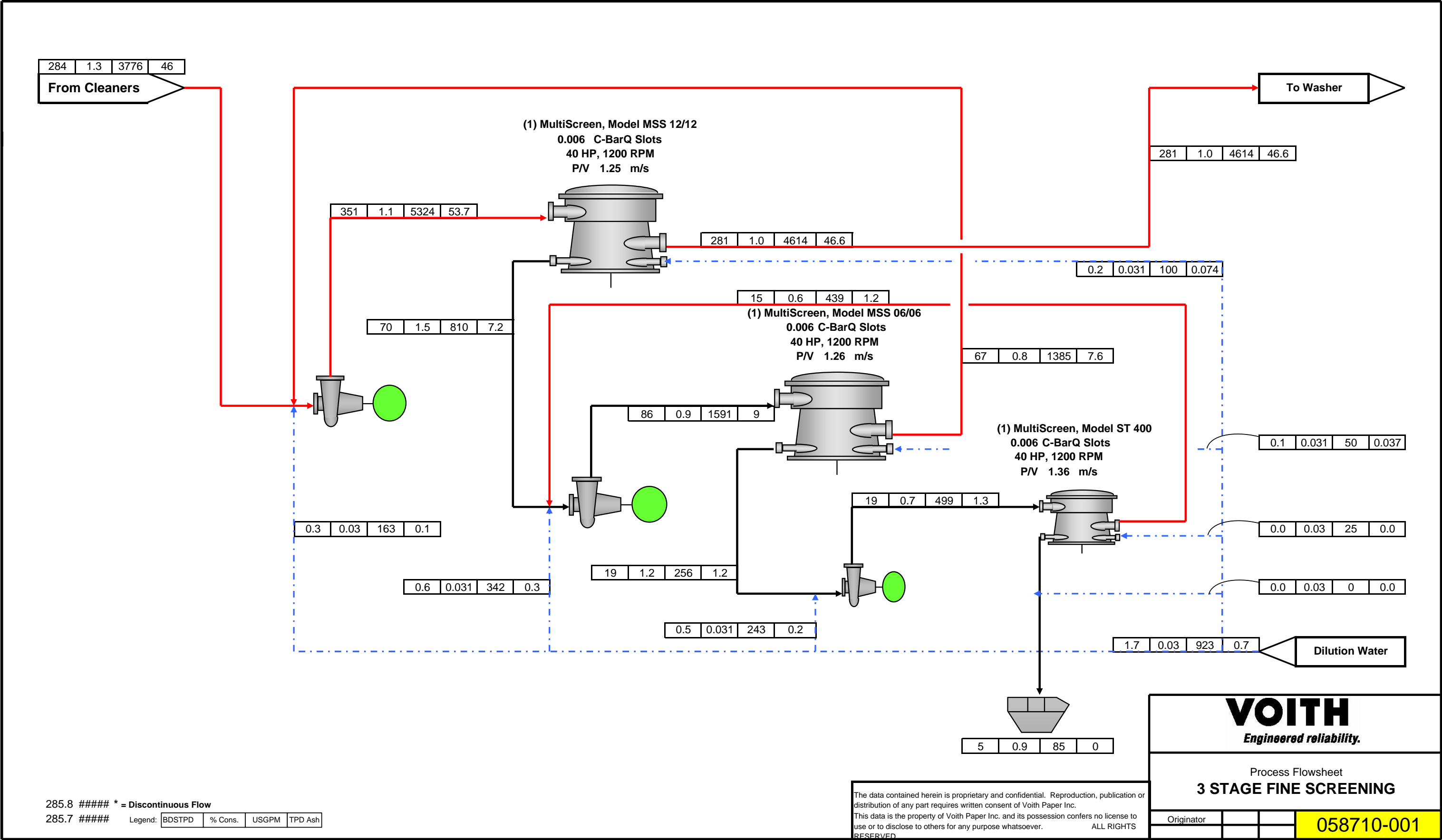
VOITH
Engineered reliability.

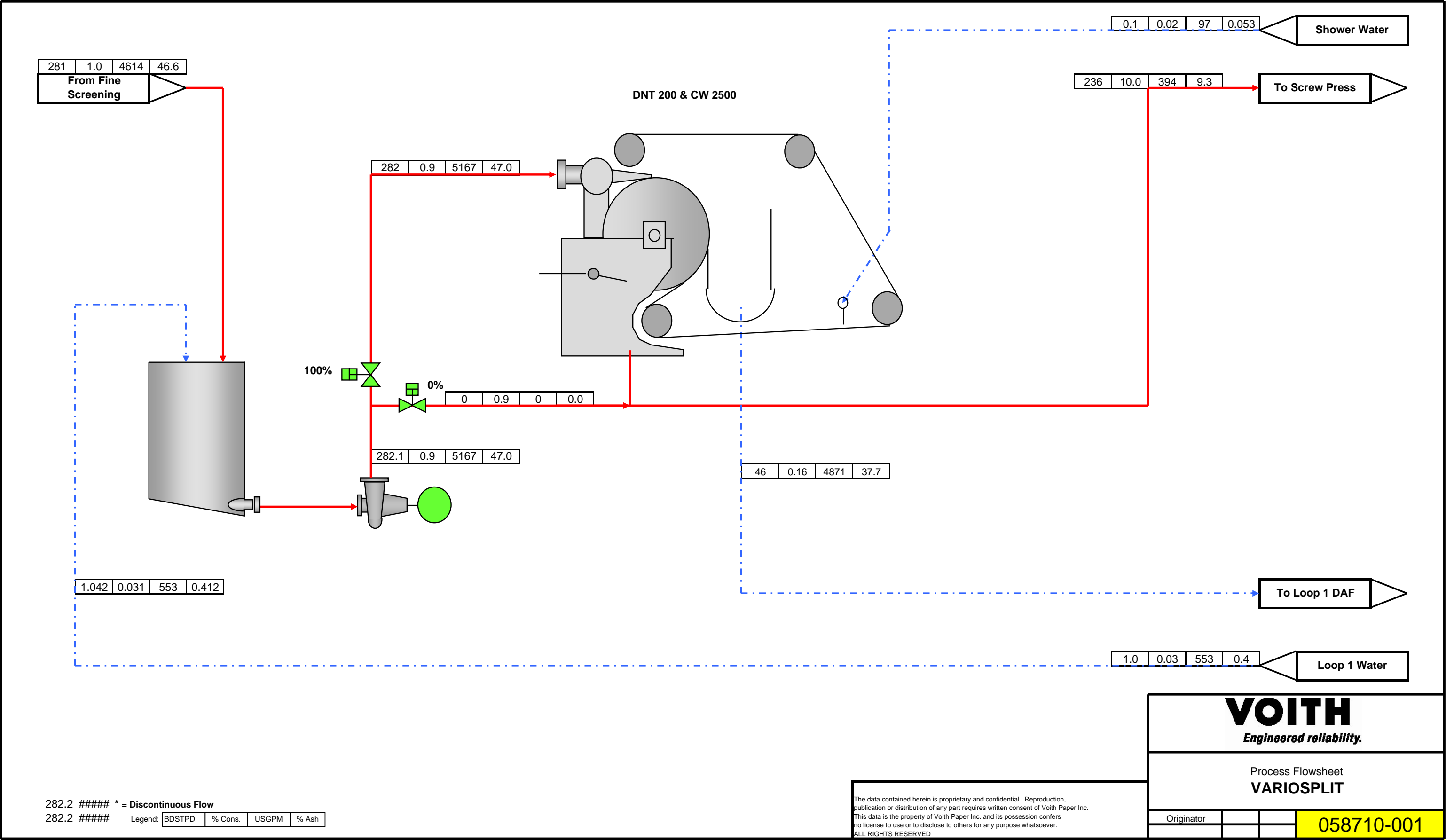
Process Flowsheet

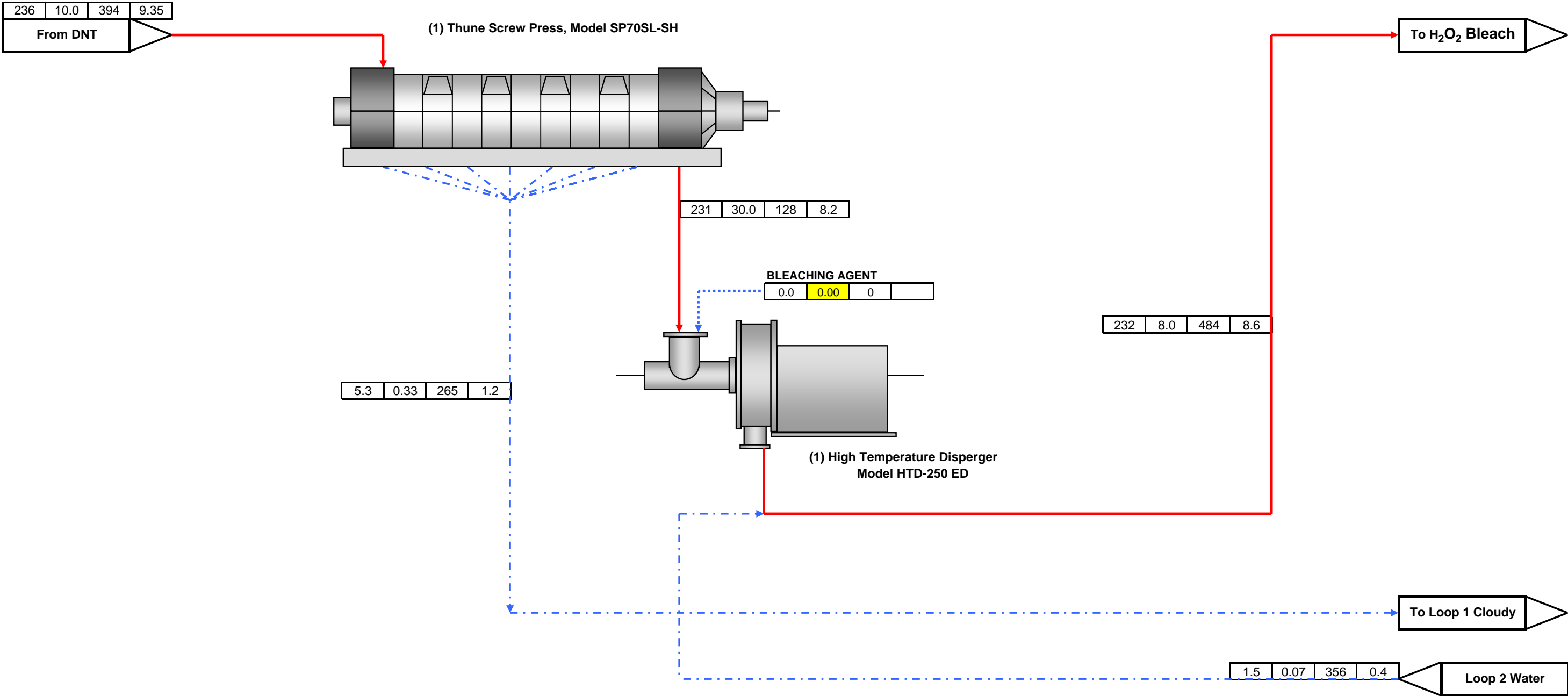
Clean Pac 350 with EcoMizer CLEANER SYSTEM

Originator

058710-001







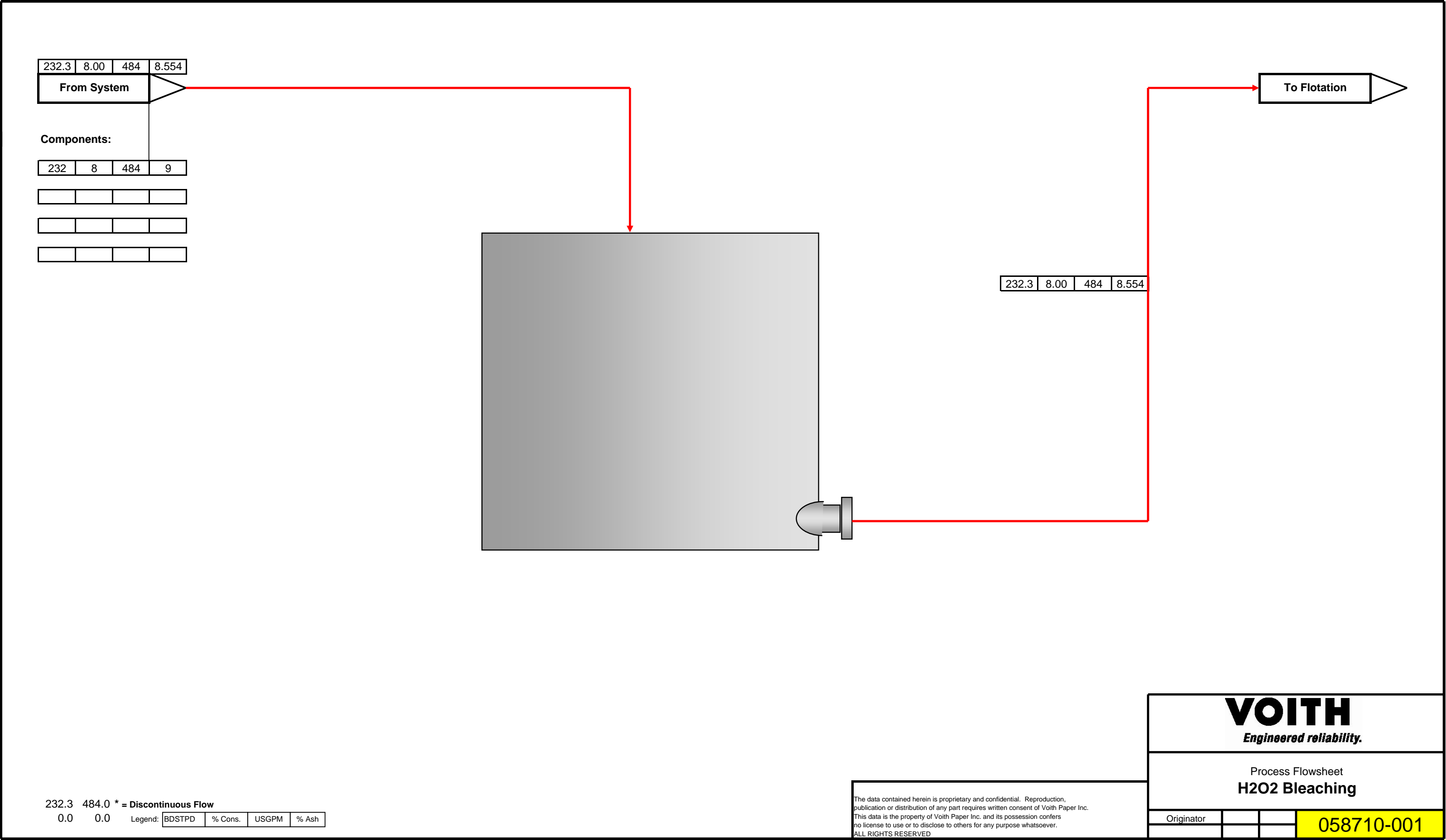
237.5 749.3 * = Discontinuous Flow
237.5 749.3 Legend: BDSTPD % Cons. USGPM % Ash

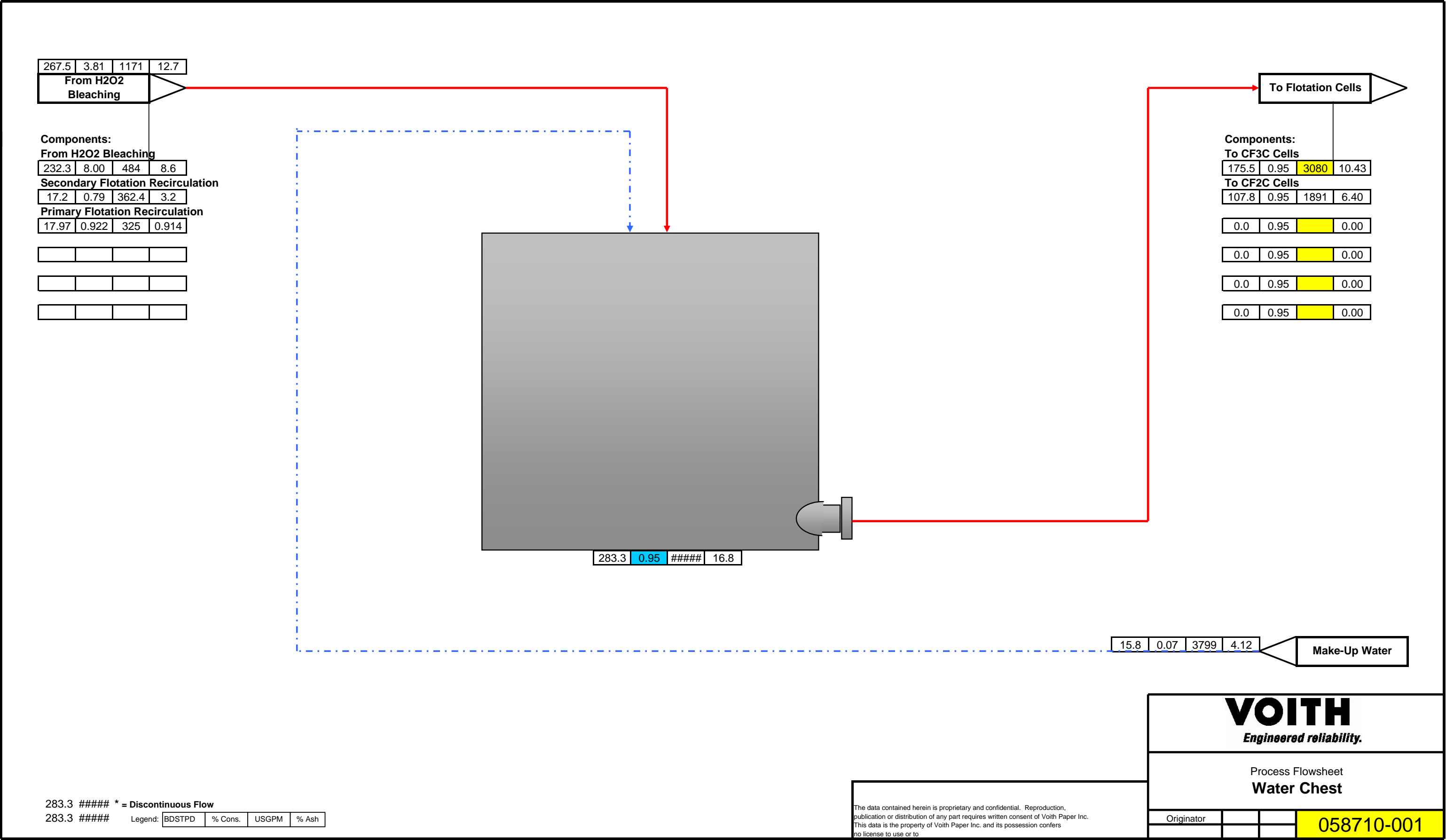
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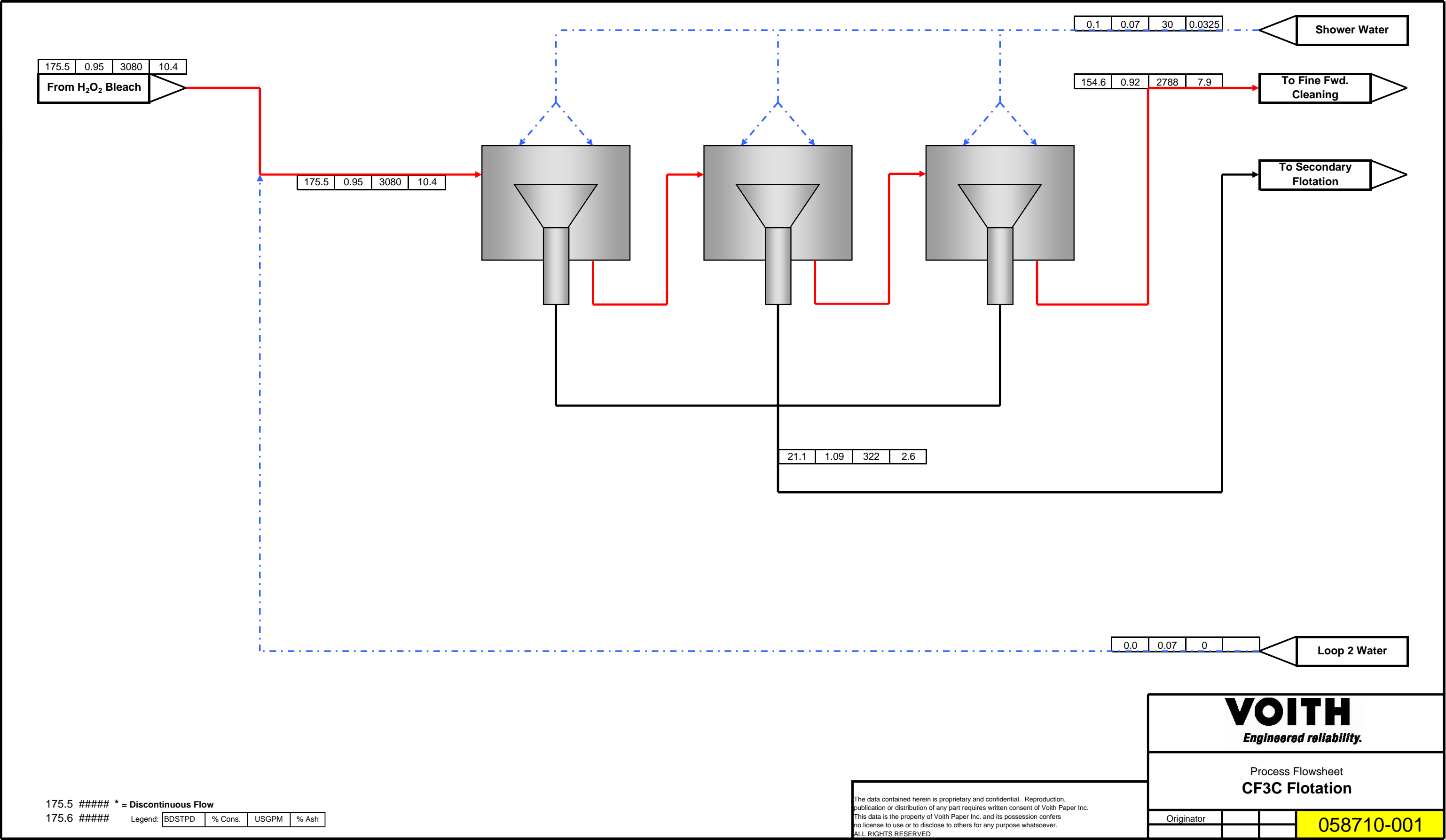
VOITH
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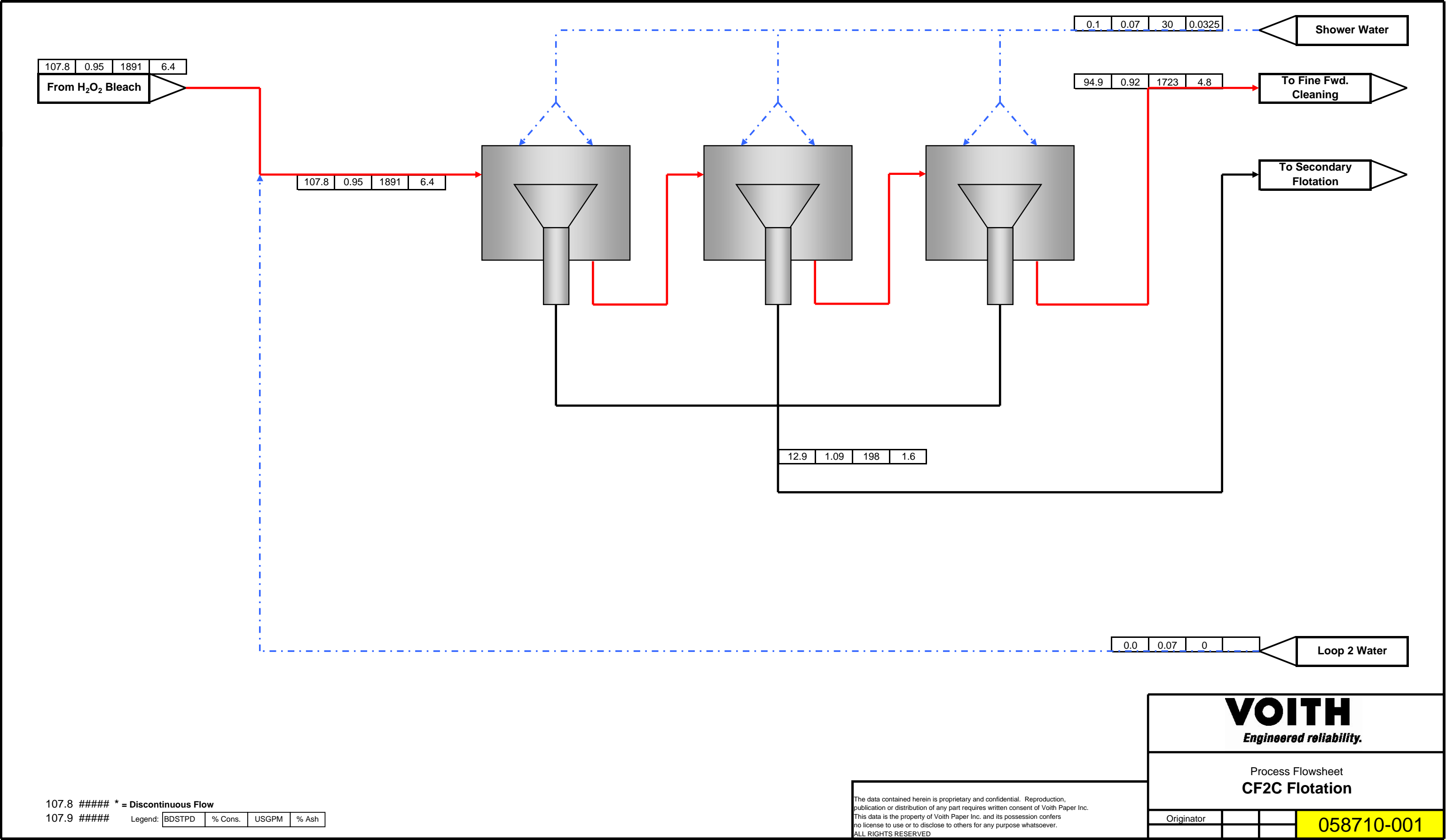
Process Flowsheet
DISPERSION SYSTEM

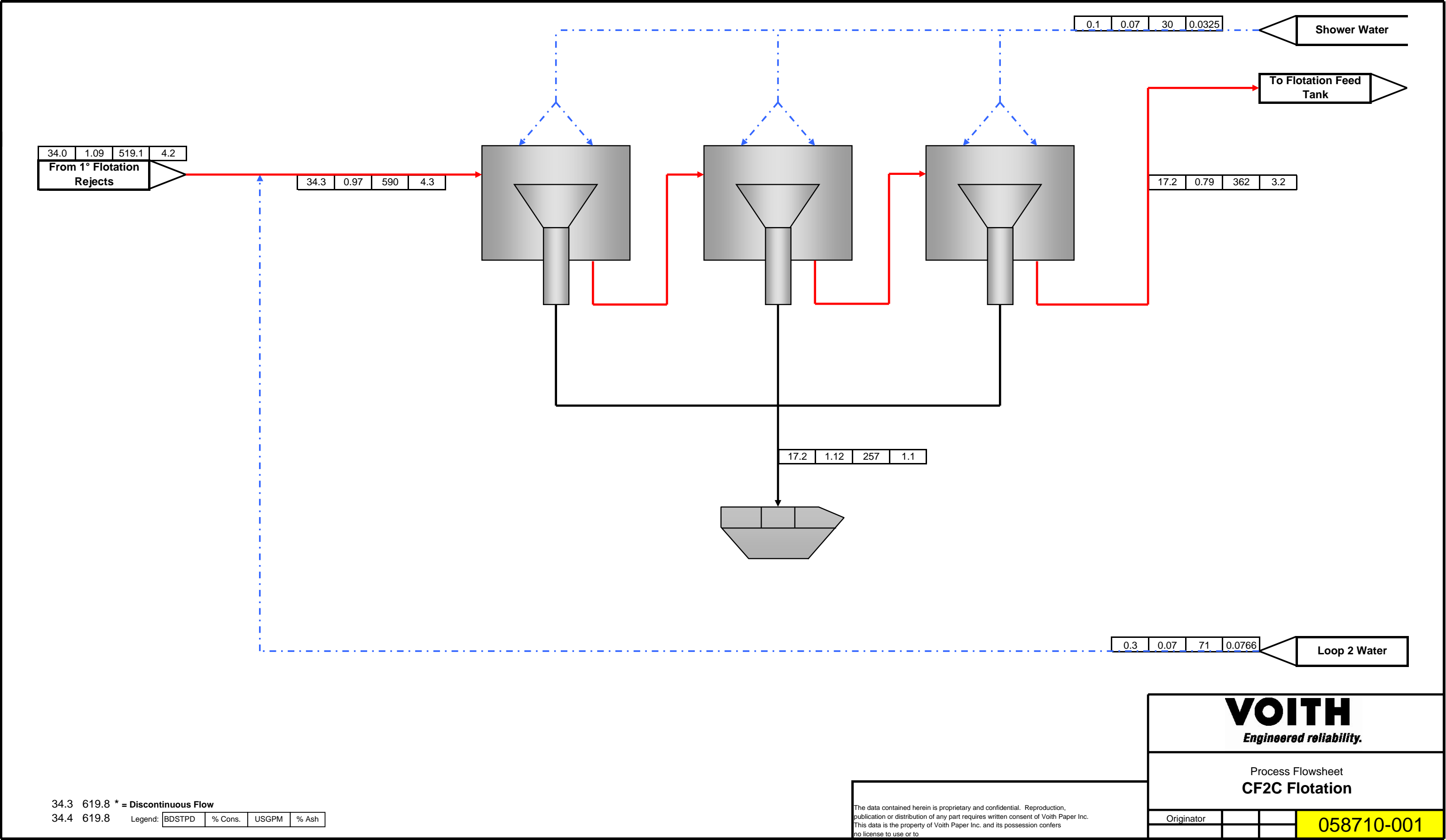
Originator			058710-001



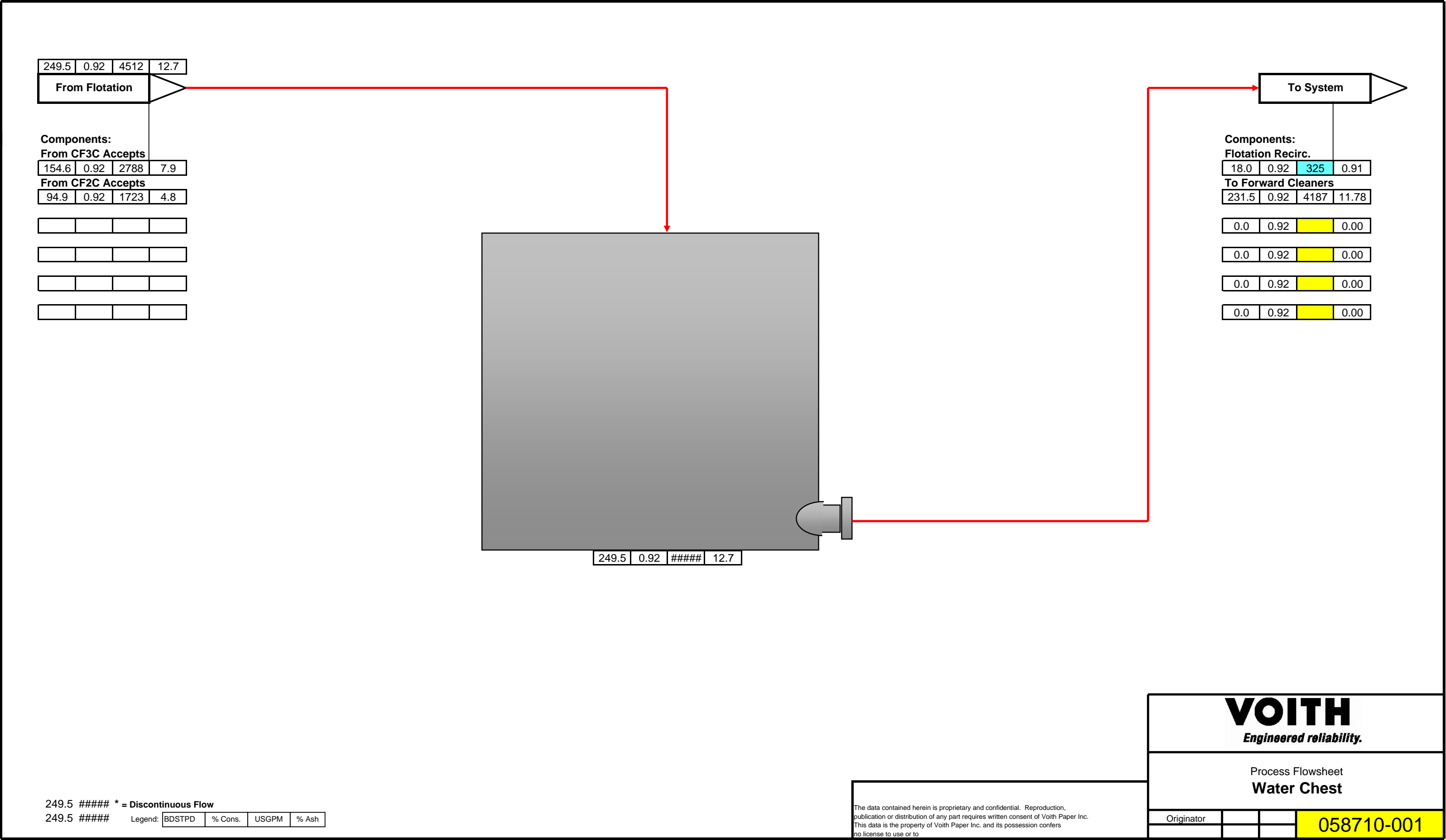


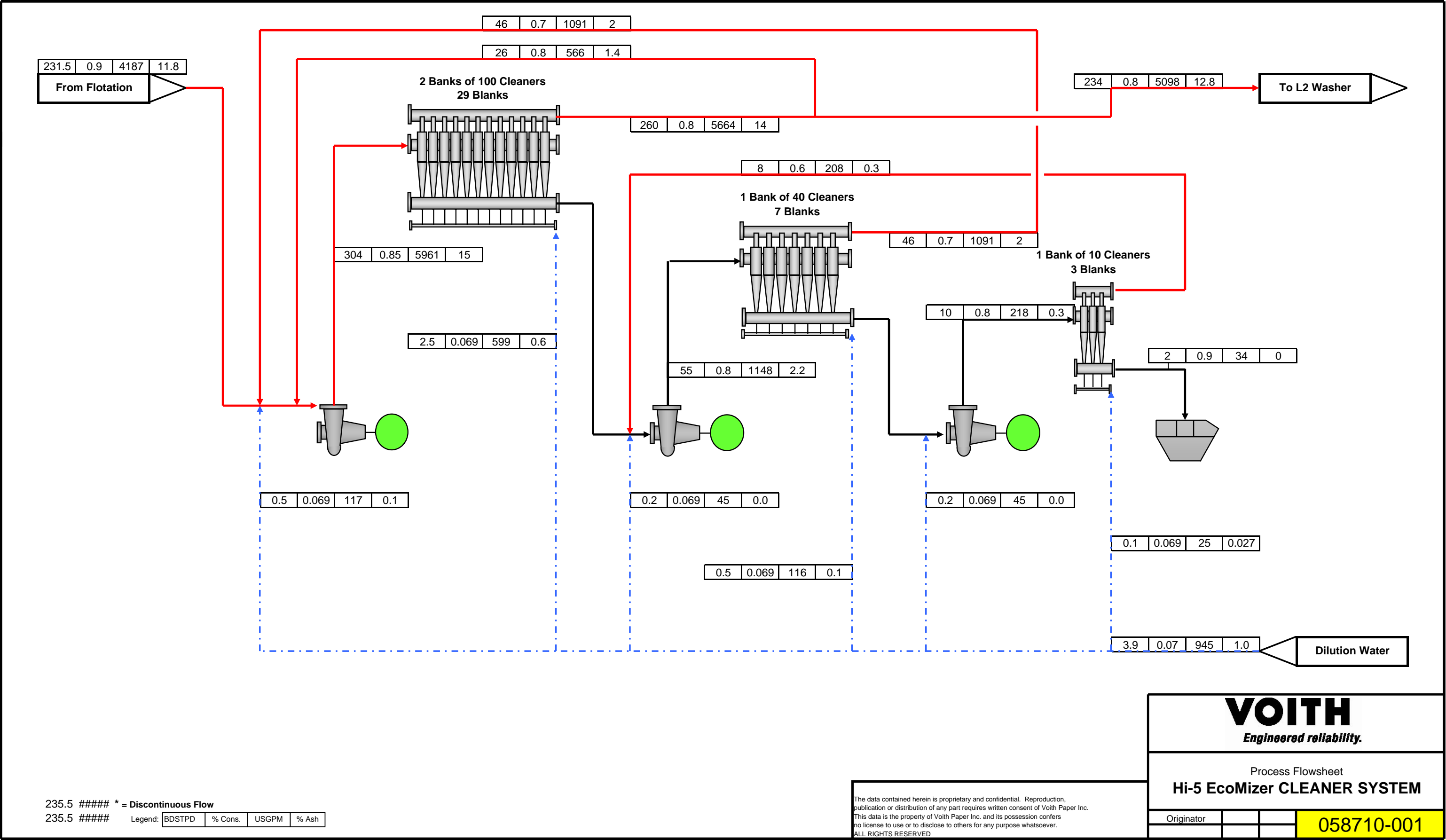


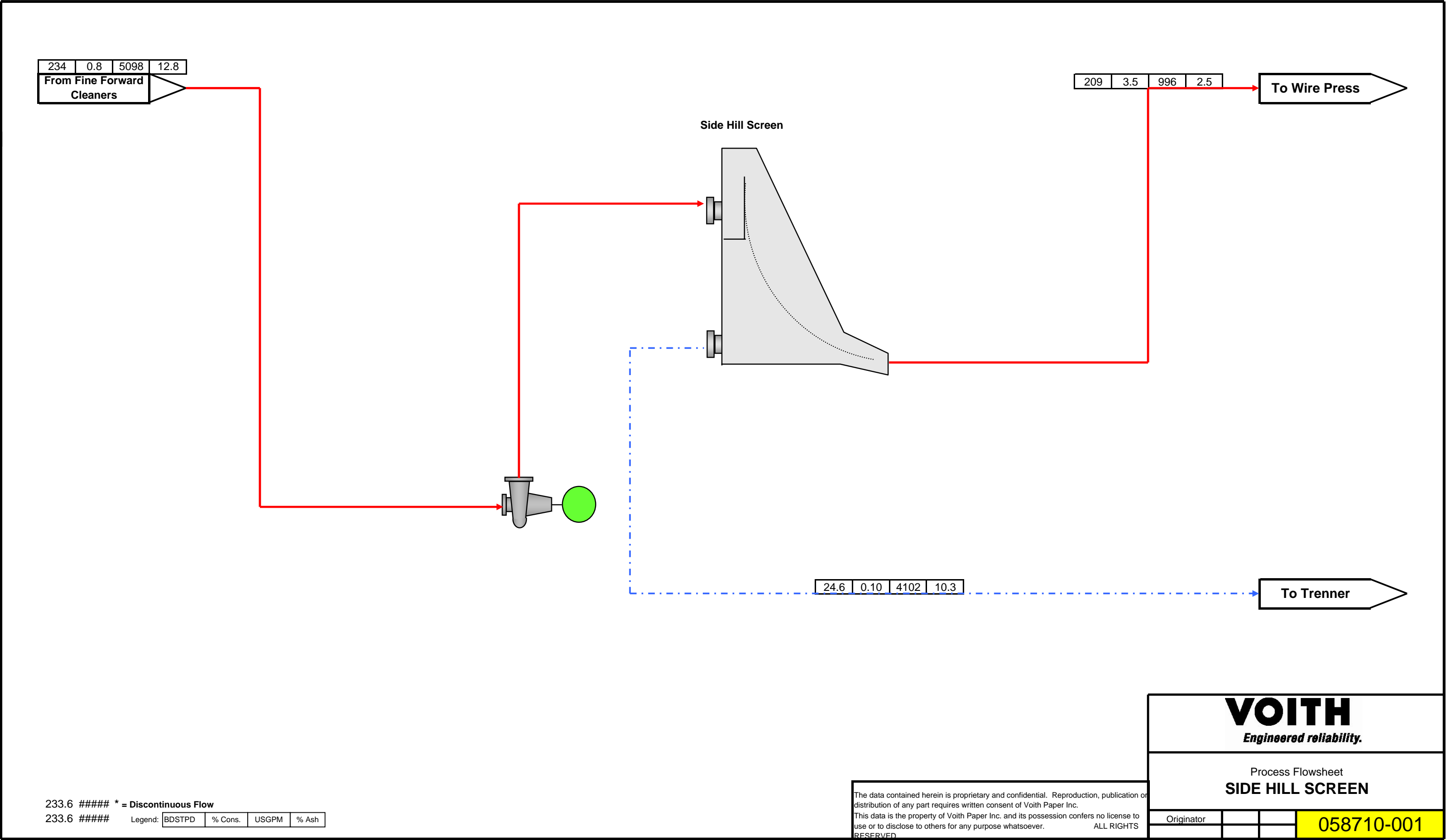


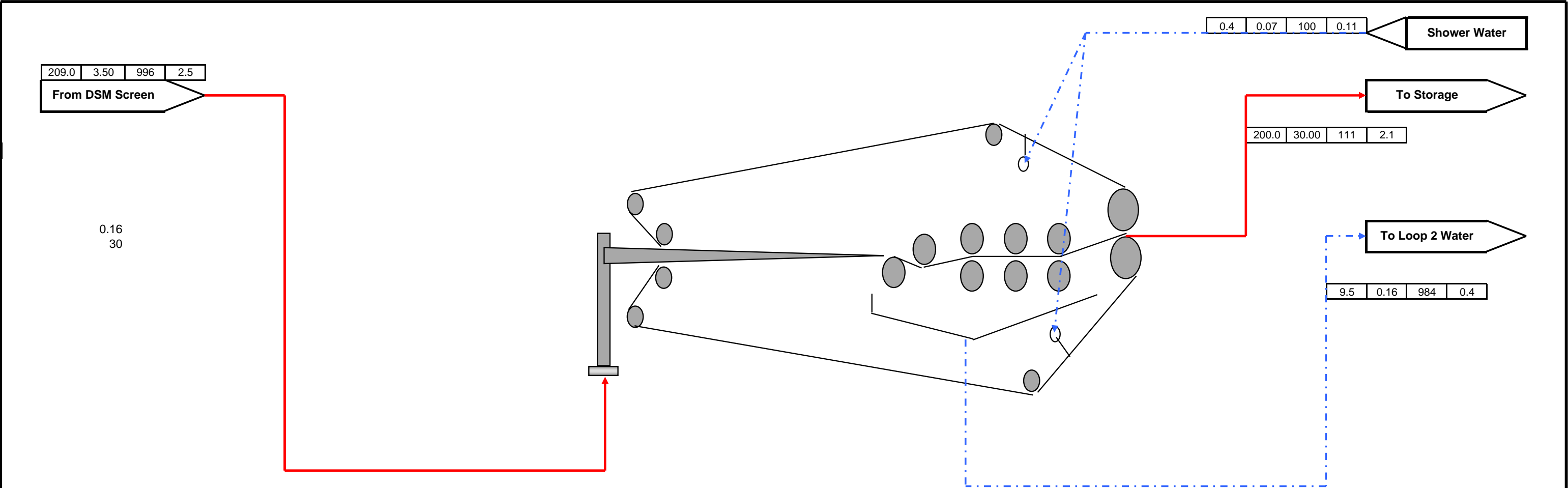


34.3 619.8 * = Discontinuous Flow
34.4 619.8 Legend: BDSTPD % Cons. USGPM % Ash









0.16
30

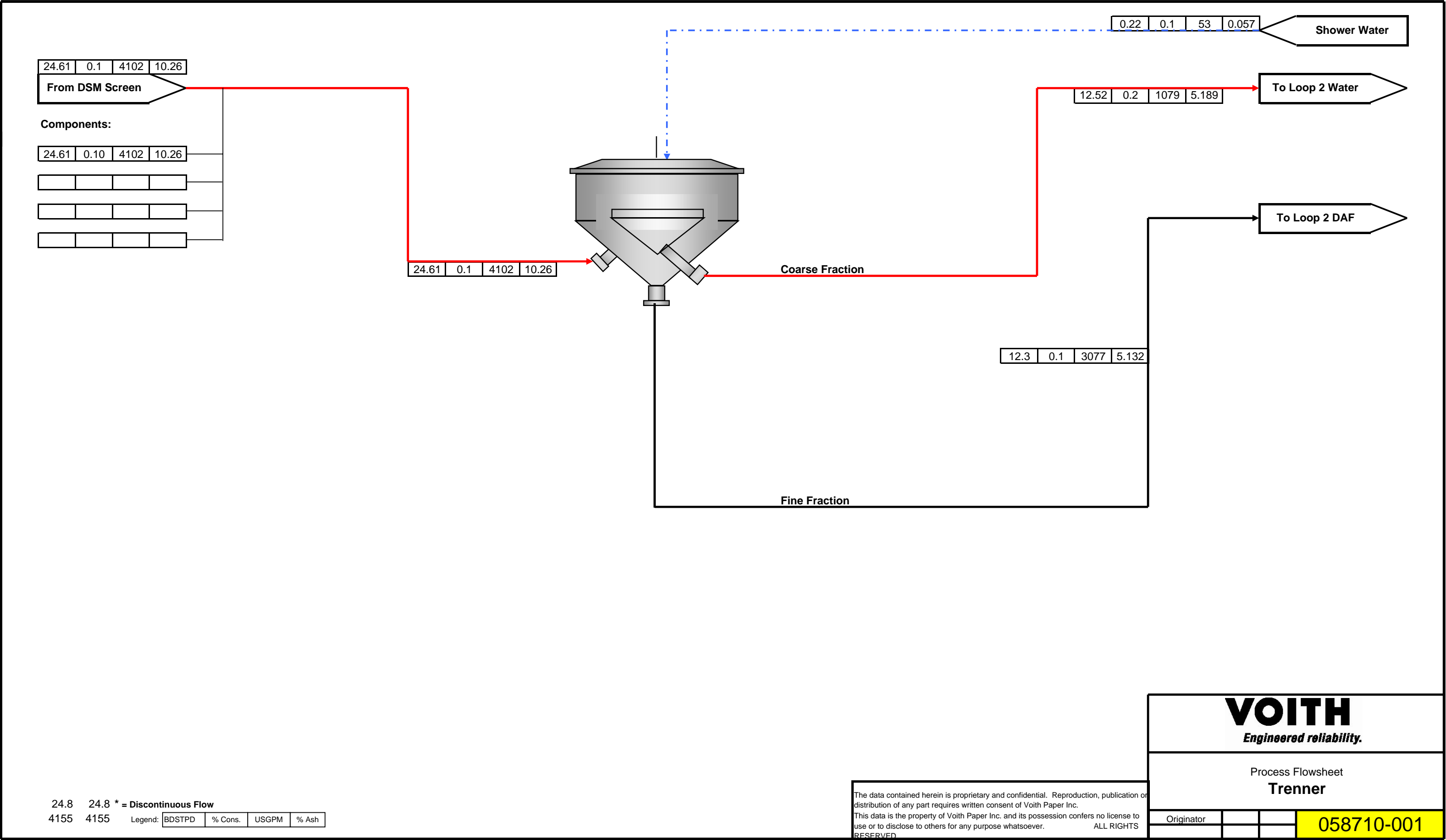
209.5 1095.6 * = Discontinuous Flow
209.5 1095.6 Legend: BDSTPD % Cons. USGPM % Ash

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Process Flowsheet
TWIN WIRE PRESS

Originator			058710-001



46.12	0.2	4871	37.7
-------	-----	------	------

From Previous

Components:

From Loop 1 Washer

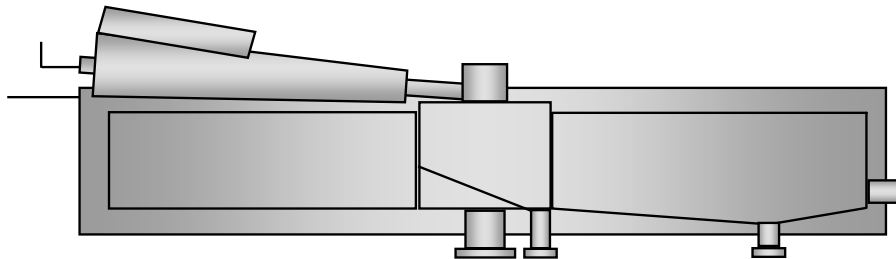
46	0.2	4871	37.7
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Deltapurge, Model NG 160



46.12	0.2	4871	37.7
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2.778	0.01	4630	2.275
-------	------	------	-------

43.34	3	240.8	35.43
-------	---	-------	-------

0.005	1	0.077	0.004
-------	---	-------	-------

Effluent Treatment

To Loop 1 Clear Water

46.1 4871 * = Discontinuous Flow

46.1 4871 Legend: BDSTPD % Cons. USGPM Ton Ash

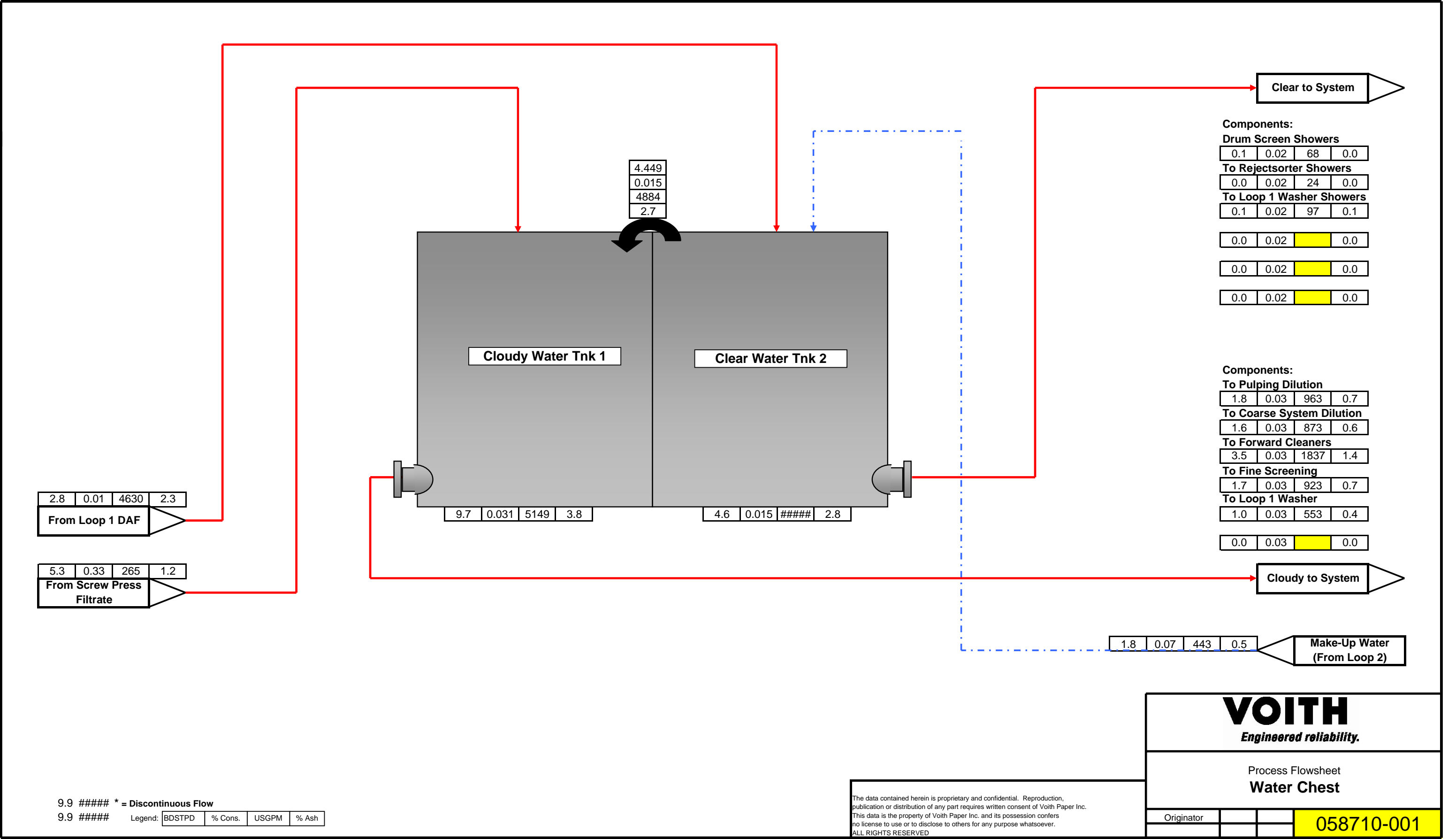
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Process Flowsheet
DELTAPURGE NG

Originator

058710-001



12.3	0.1	3077	5.132
------	-----	------	-------

From Previous

Components:
From Trenner Short Fraction

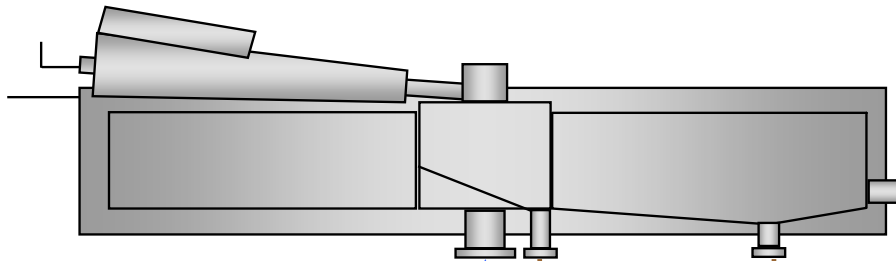
12	0.1	3077	5.1
----	-----	------	-----

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Deltapurge, Model NG 105



12.3	0.1	3077	5.132
------	-----	------	-------

1.811	0.01	3018	0.756
-------	------	------	-------

10.49	3	58.3	4.376
-------	---	------	-------

0.001	1	0.021	5E-04
-------	---	-------	-------

Effluent Treatment

To Loop 2 Clear
Tank

12.3 3077 * = Discontinuous Flow

12.3 3077 Legend: BDSTPD % Cons. USGPM Ton Ash

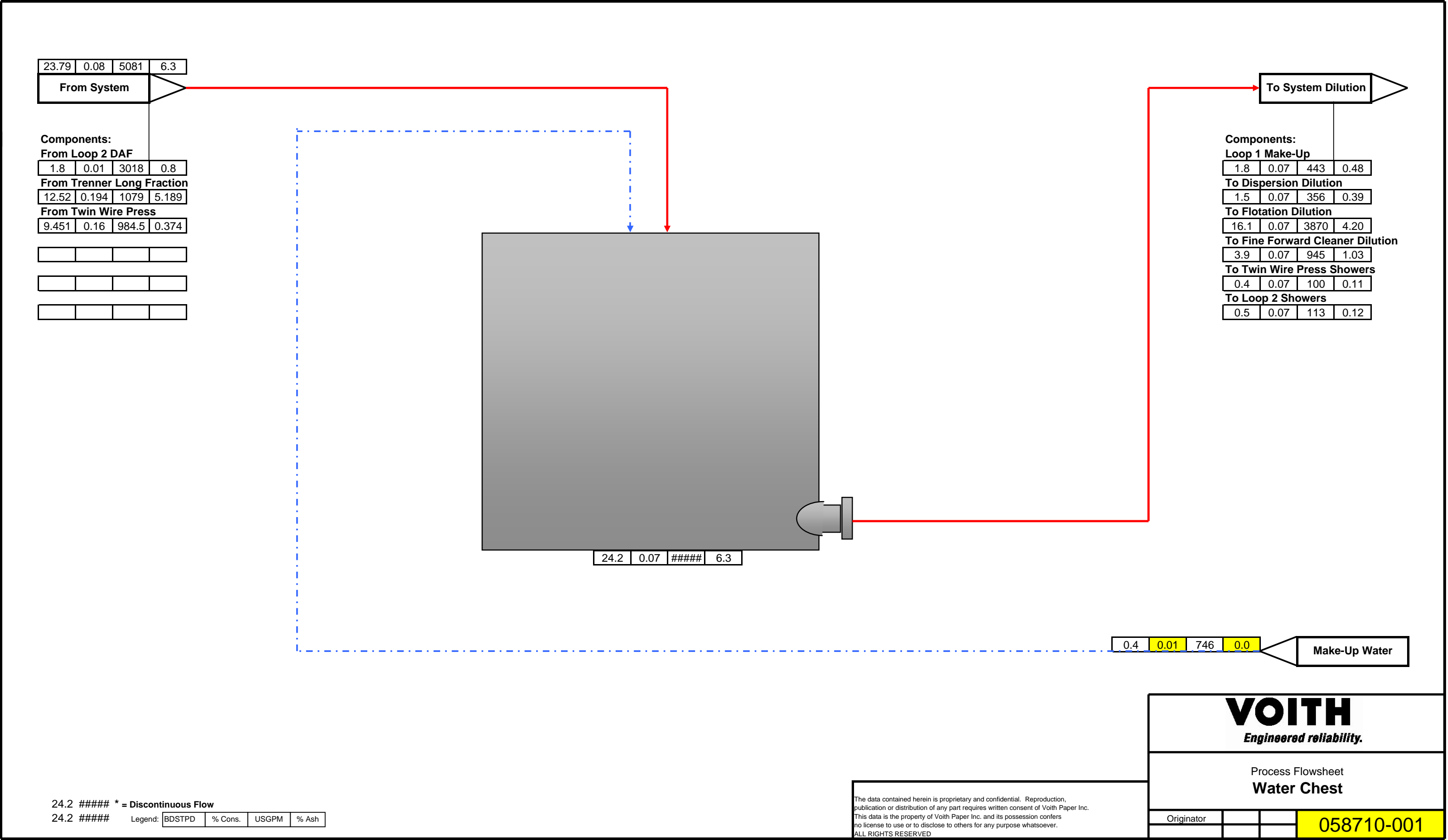
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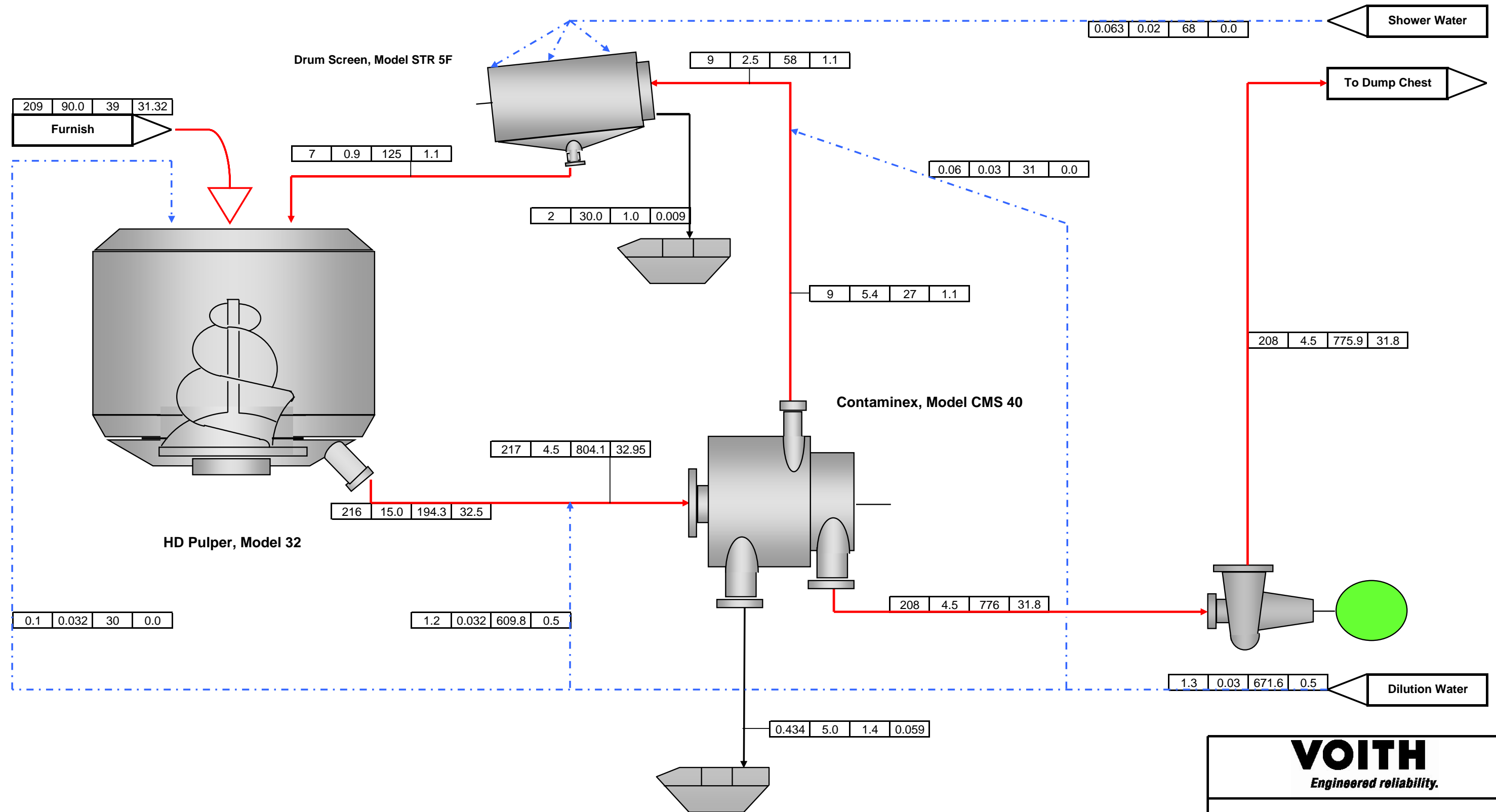
VOITH
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Process Flowsheet
DELTAPURGE NG

Originator

058710-001





210.1	778.3
210.1	778.3

* = Discontinuous Flow

Legend:	BDSTPD	% Cons.	USGPM	% Ash
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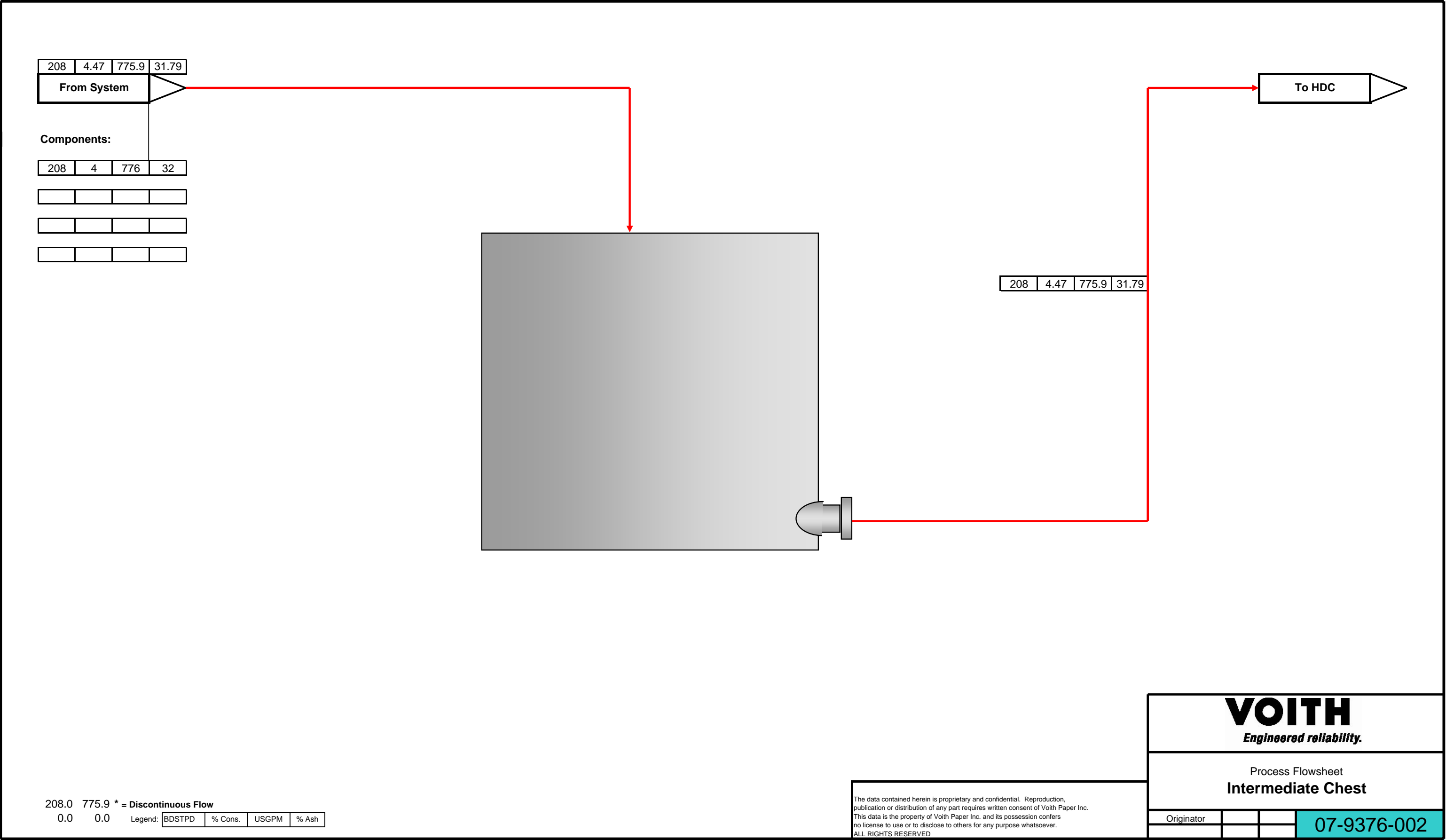
VOITH
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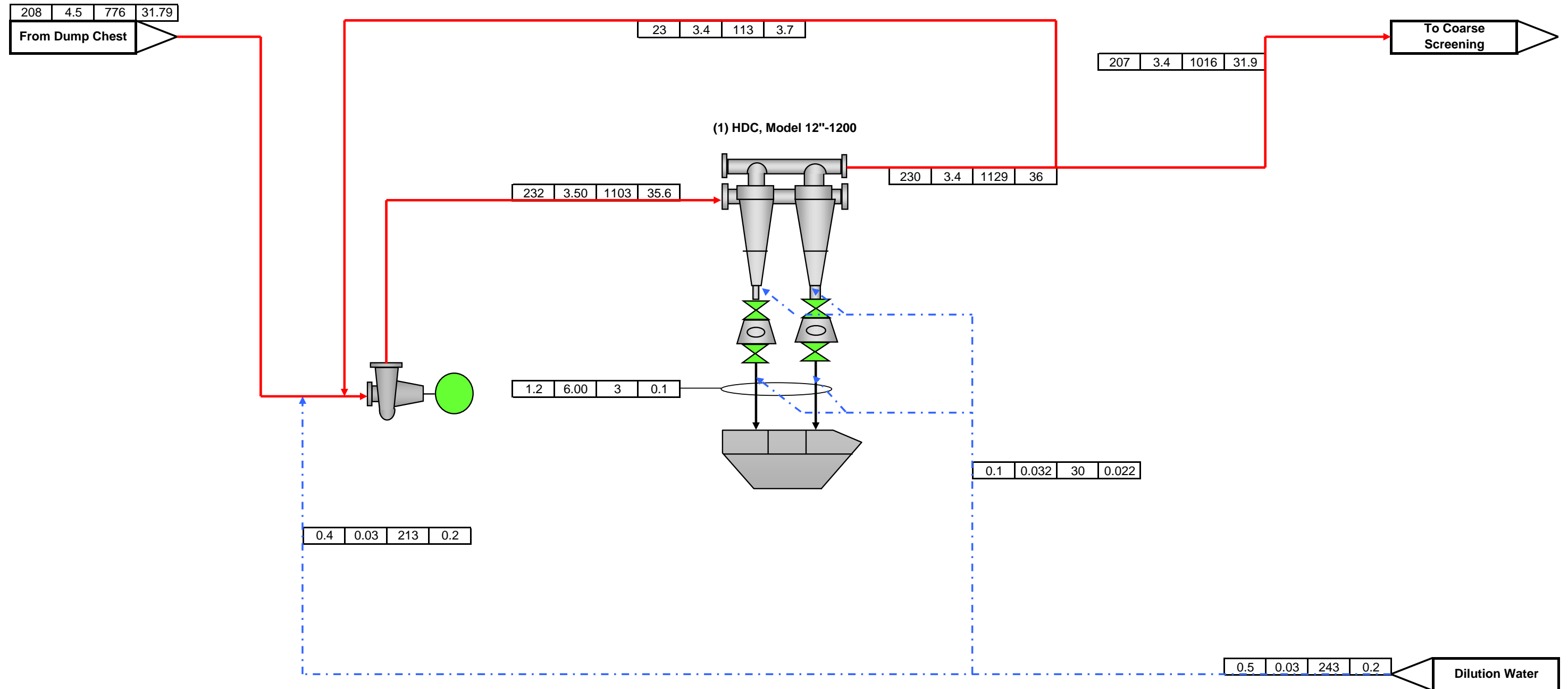
Process Flowsheet

PRECLEAN III SYSTEM

Originator

07-9376-001





208.4 ##### * = Discontinuous Flow

208.4 ##### Legend: BDSTPD % Cons. USGPM % Ash

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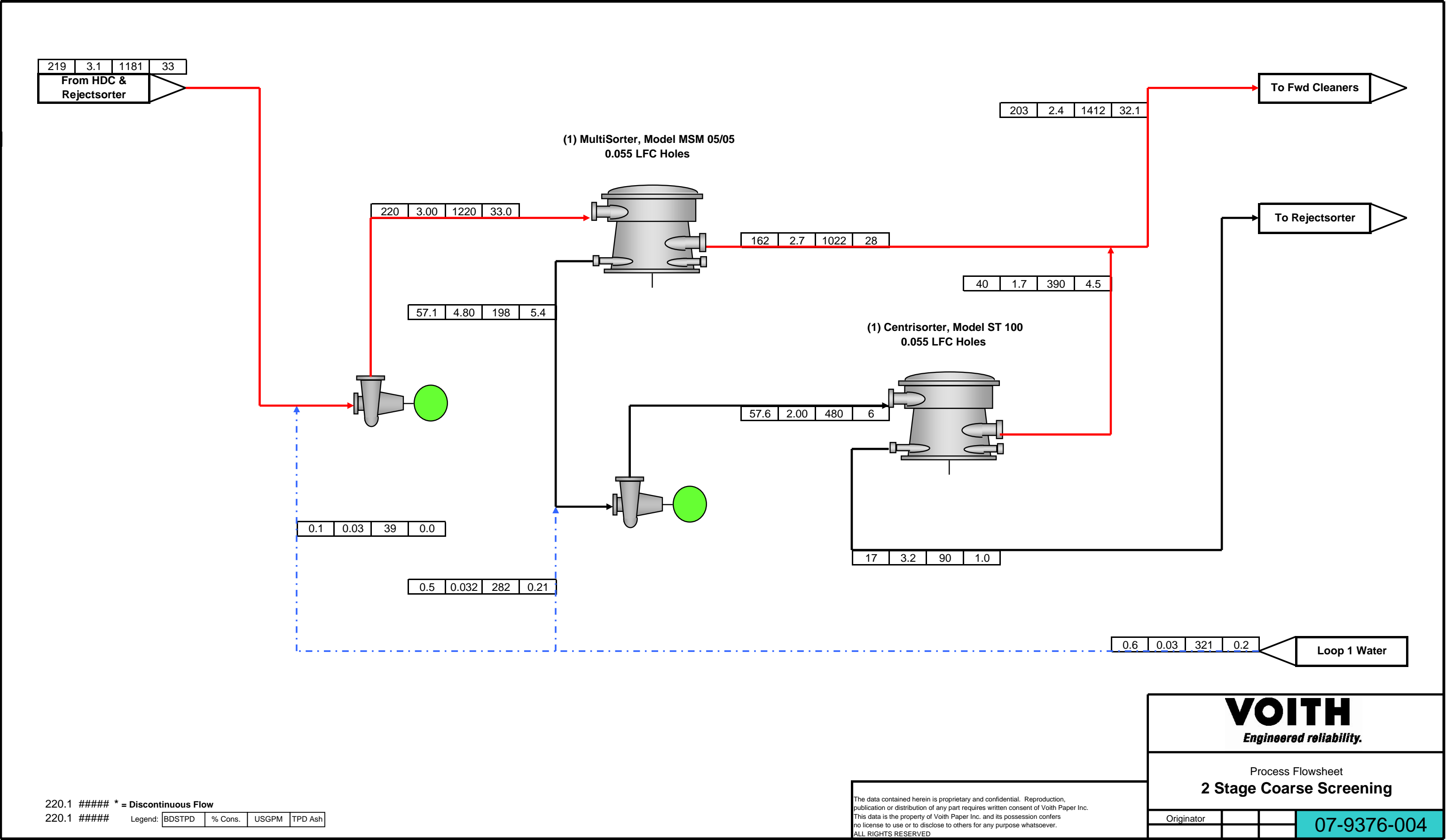
VOITH
Engineered reliability.

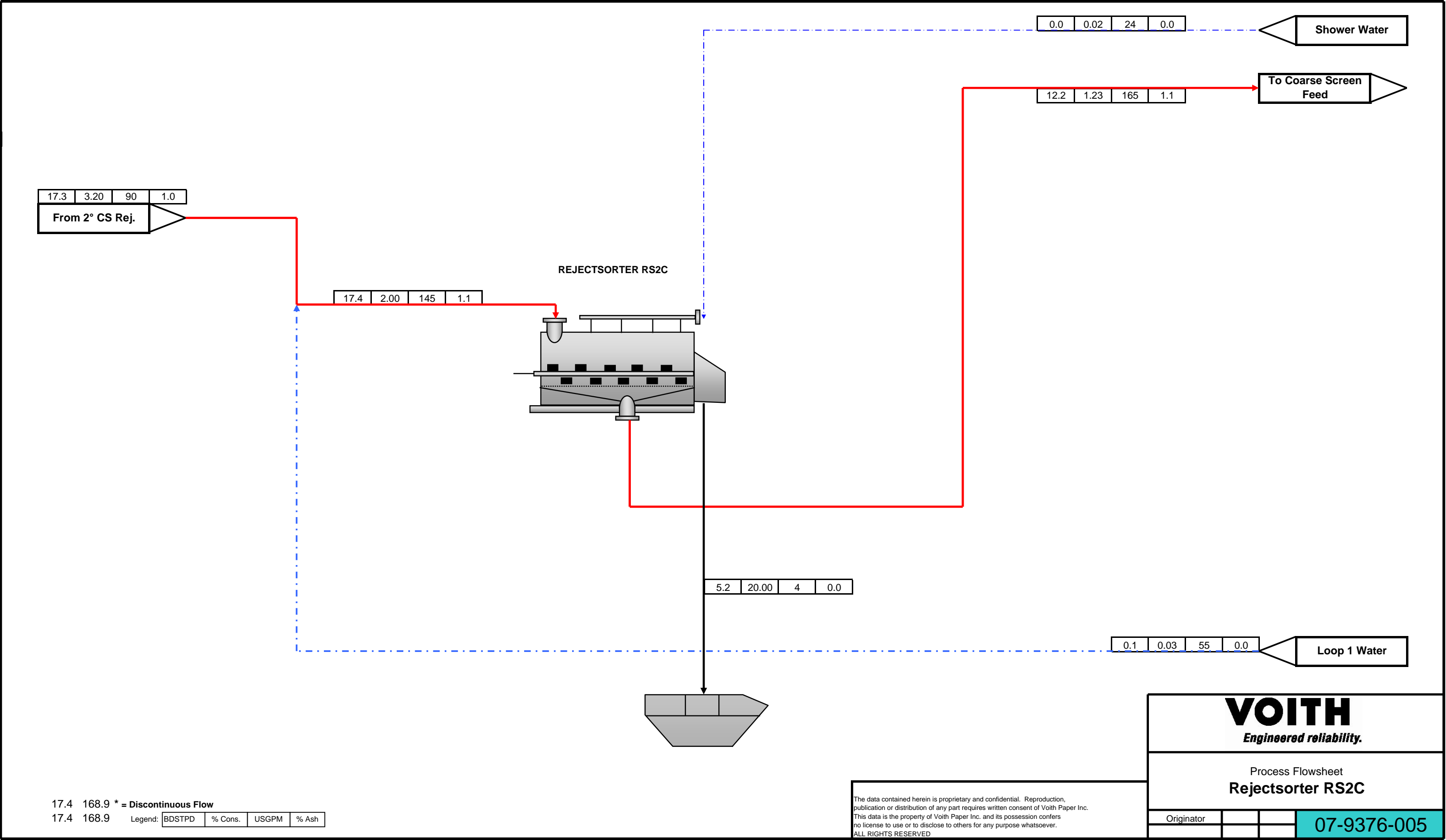
Process Flowsheet

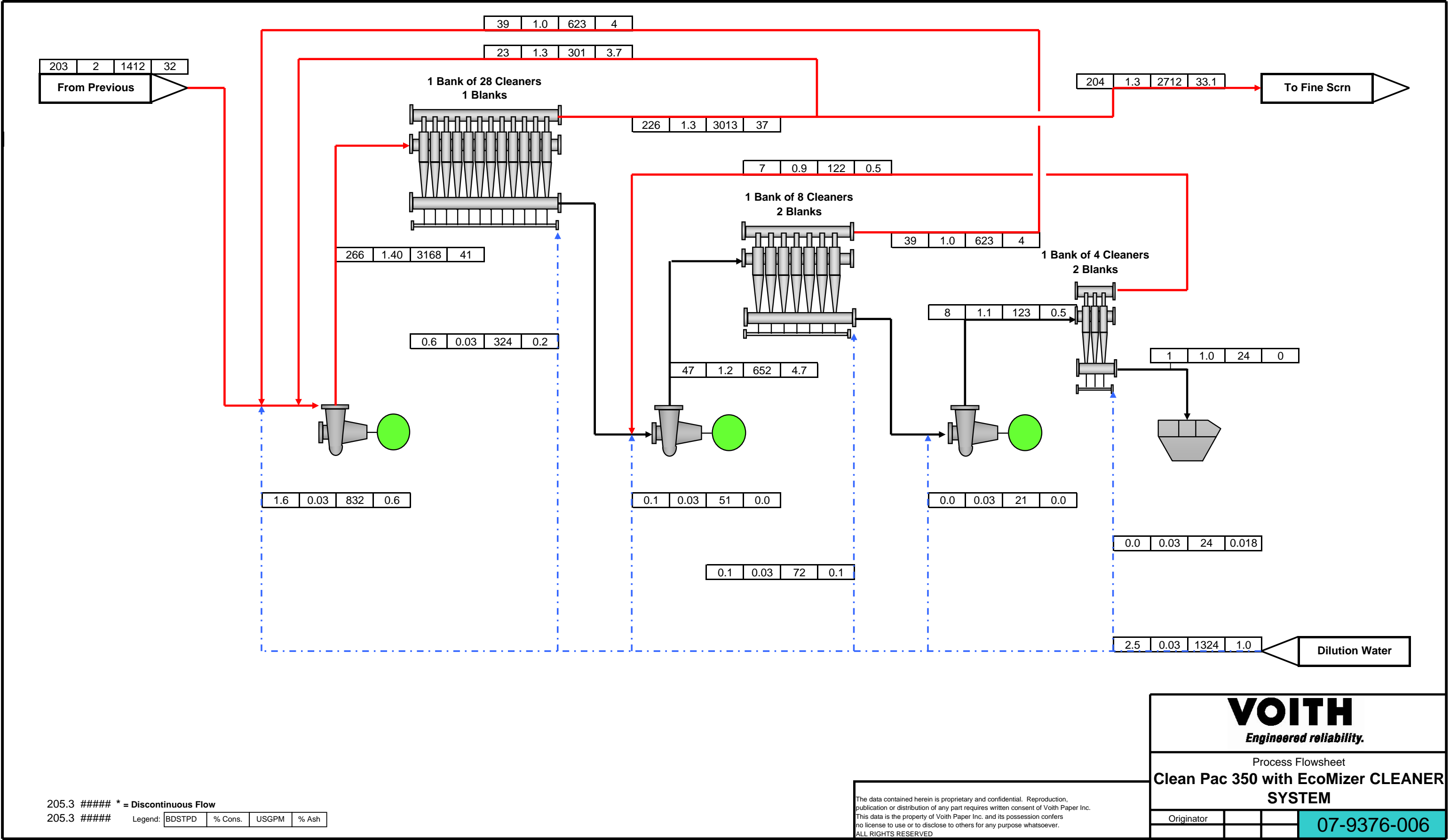
HD CLEANER SYSTEM

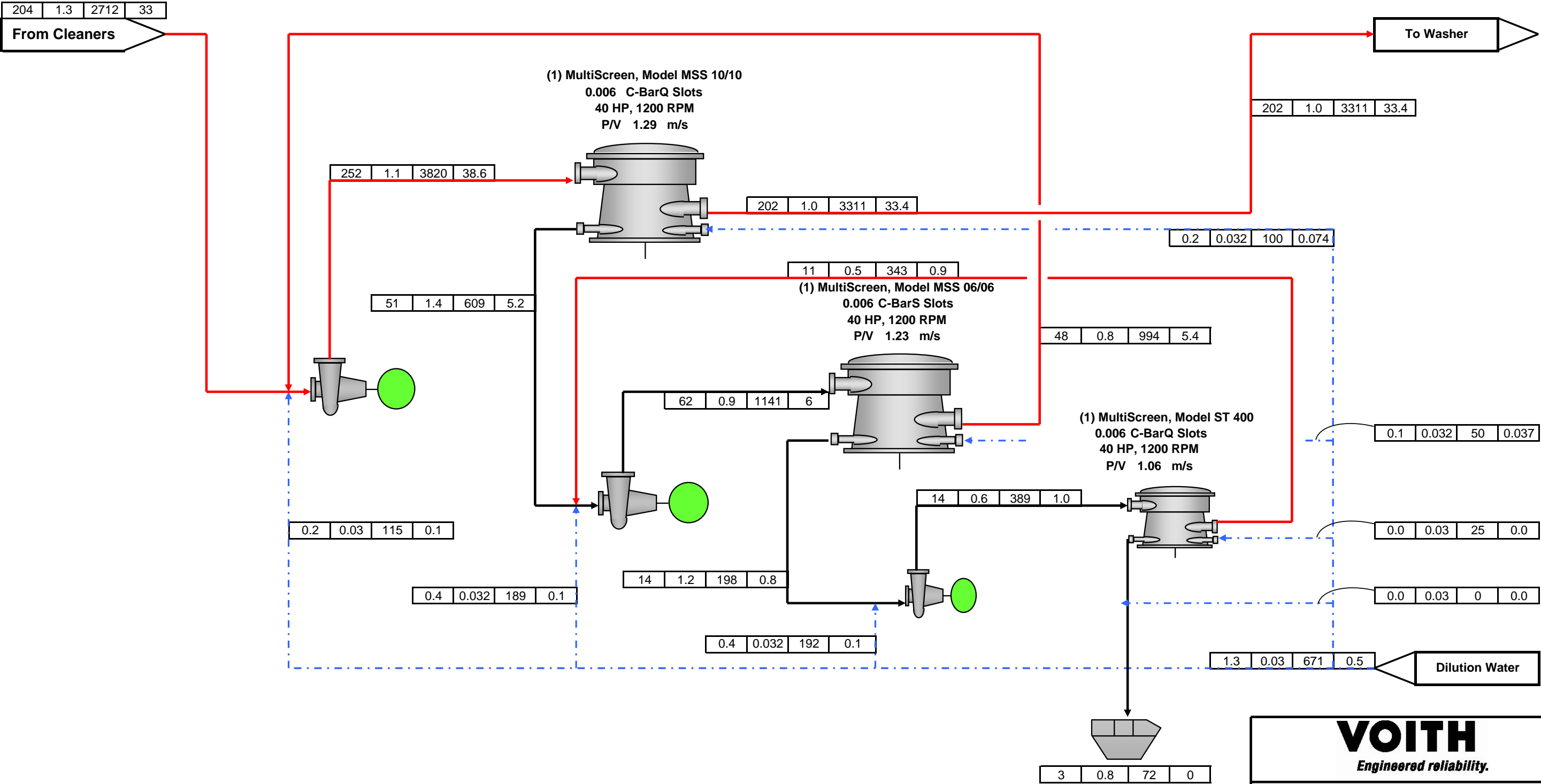
Originator

07-9376-003









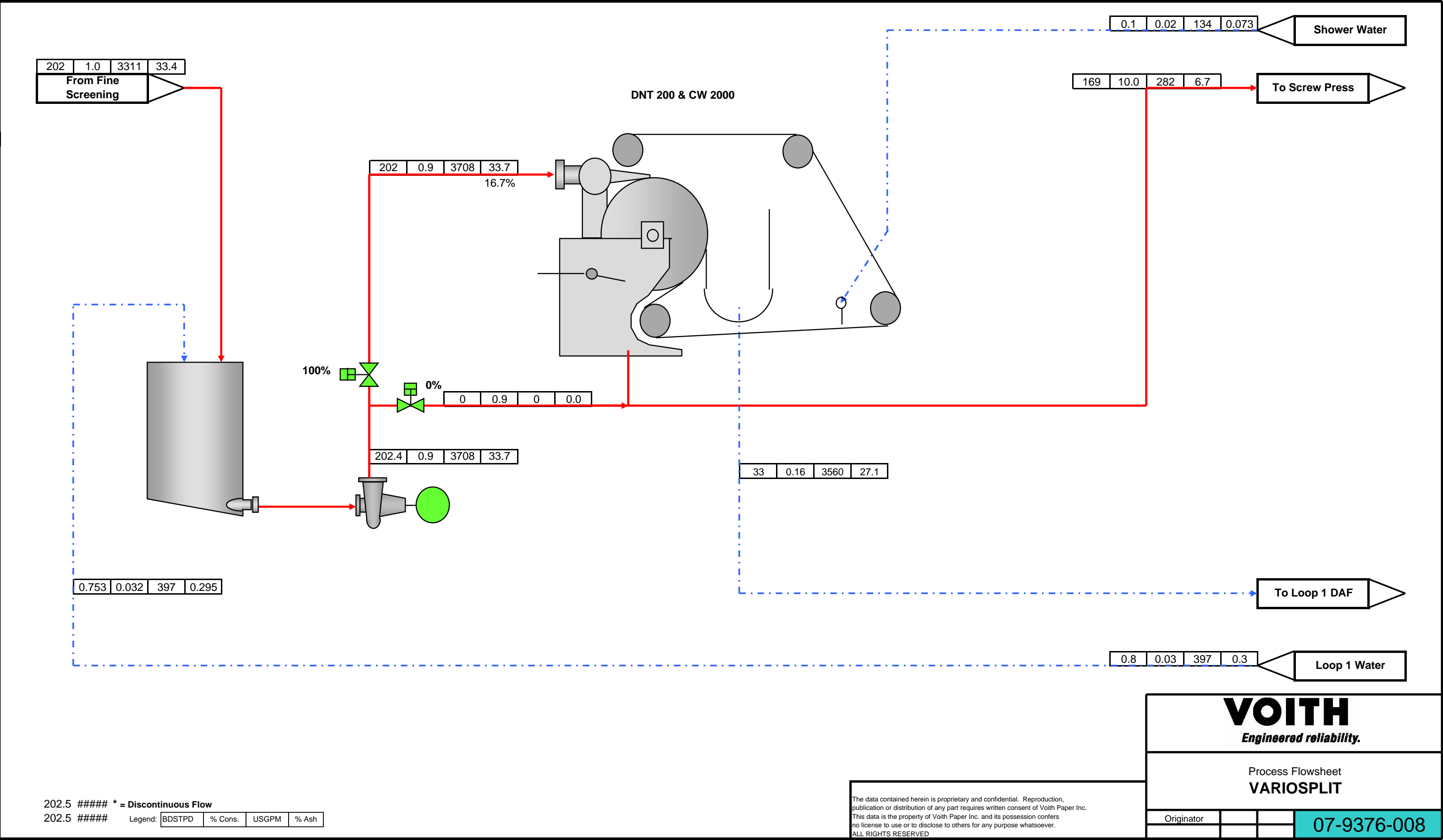
205.1 ##### * = Discontinuous Flow
205.0 ##### Legend: BDSTPD % Cons. USGPM TPD Ash

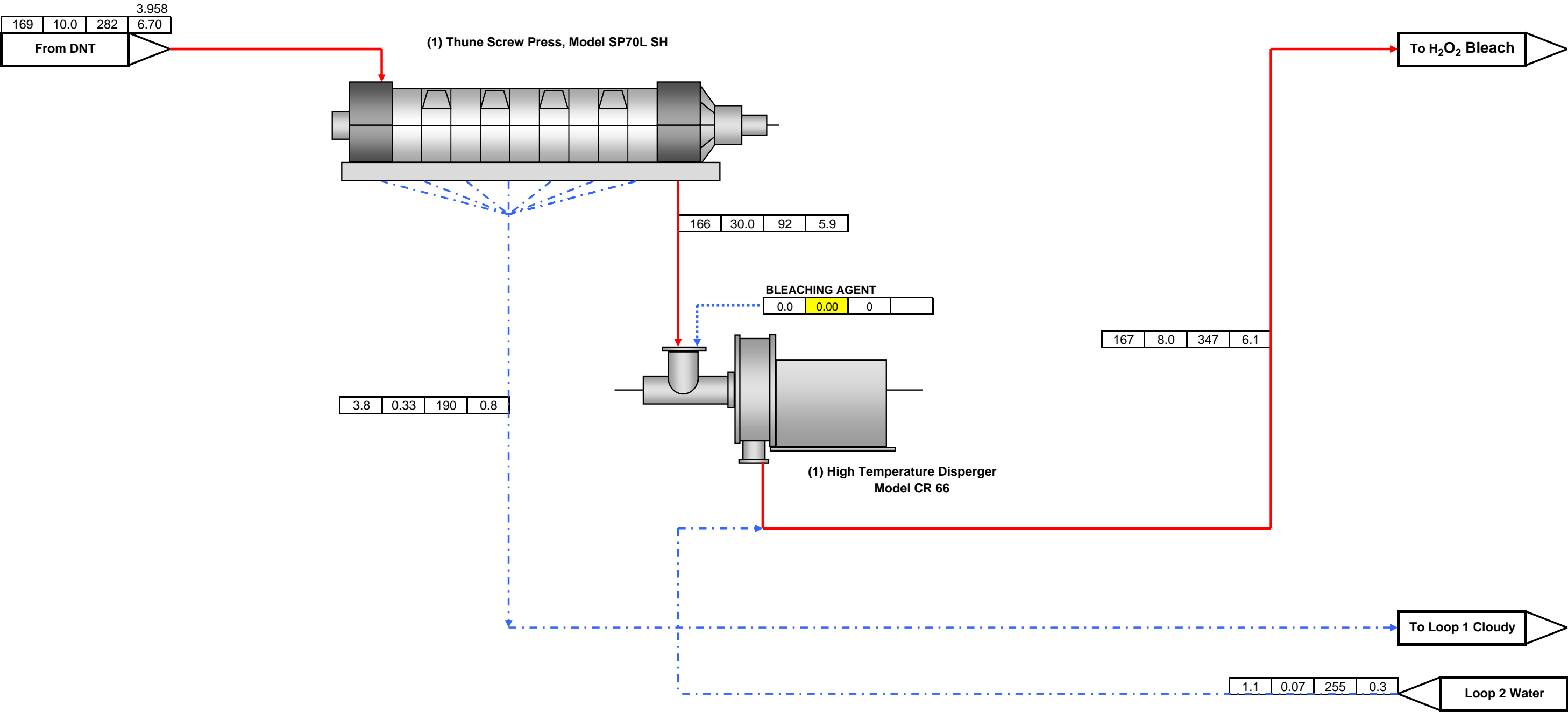
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Process Flowsheet
3 STAGE FINE SCREENING

Originator			07-9376-007
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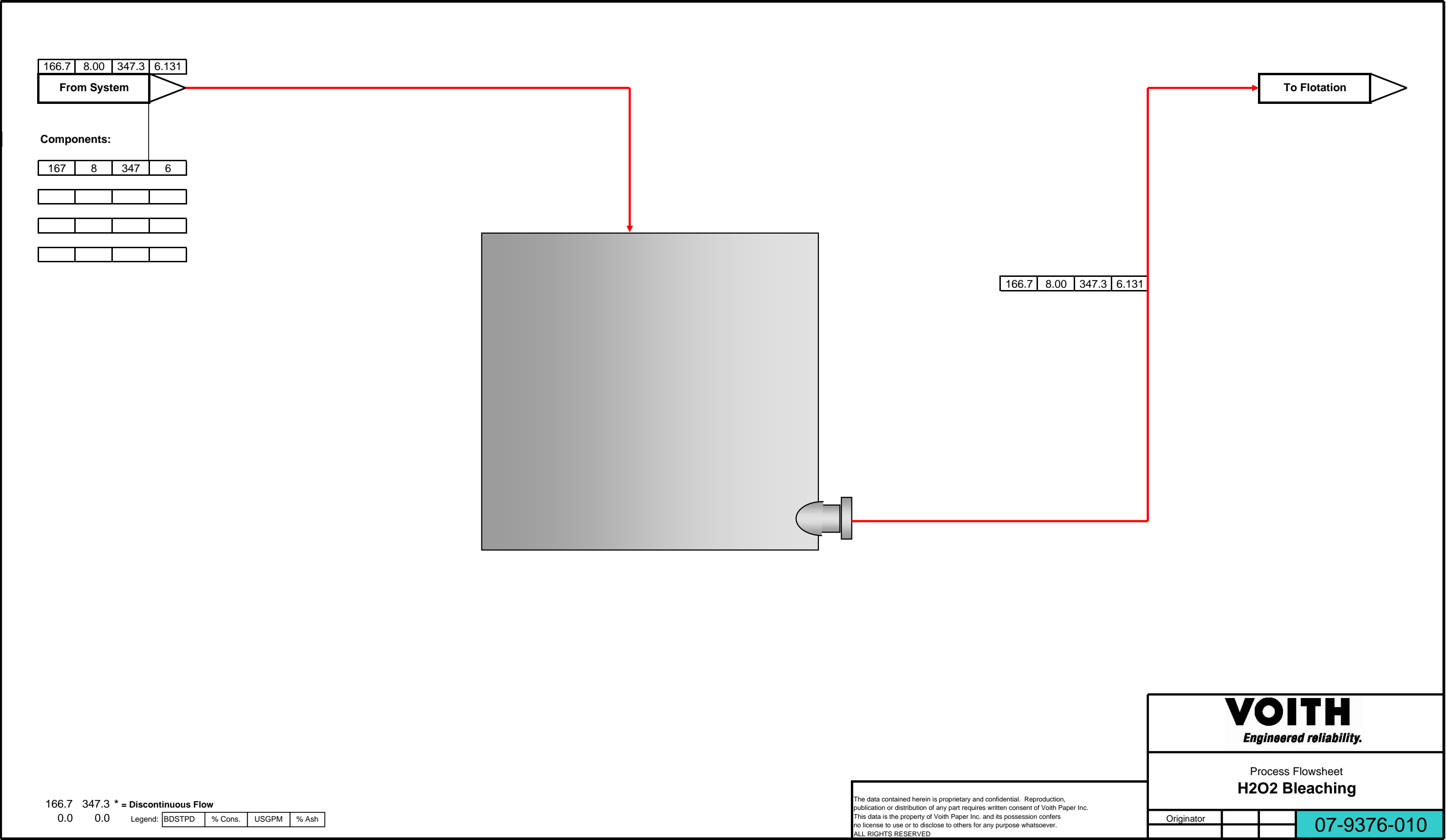
170.5 537.7 * = Discontinuous Flow
170.5 537.7 Legend: BDSTPD % Cons. USGPM % Ash

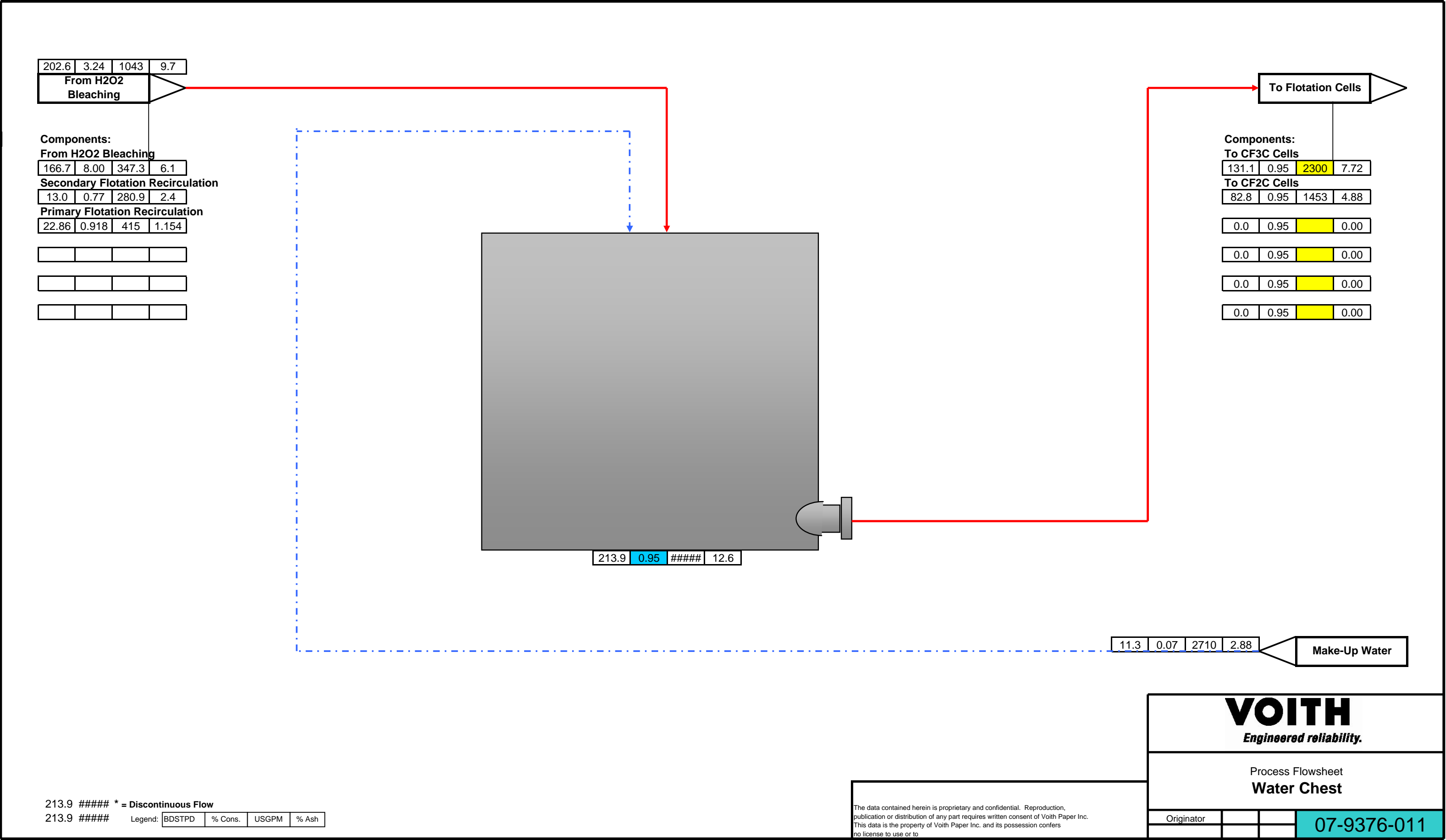
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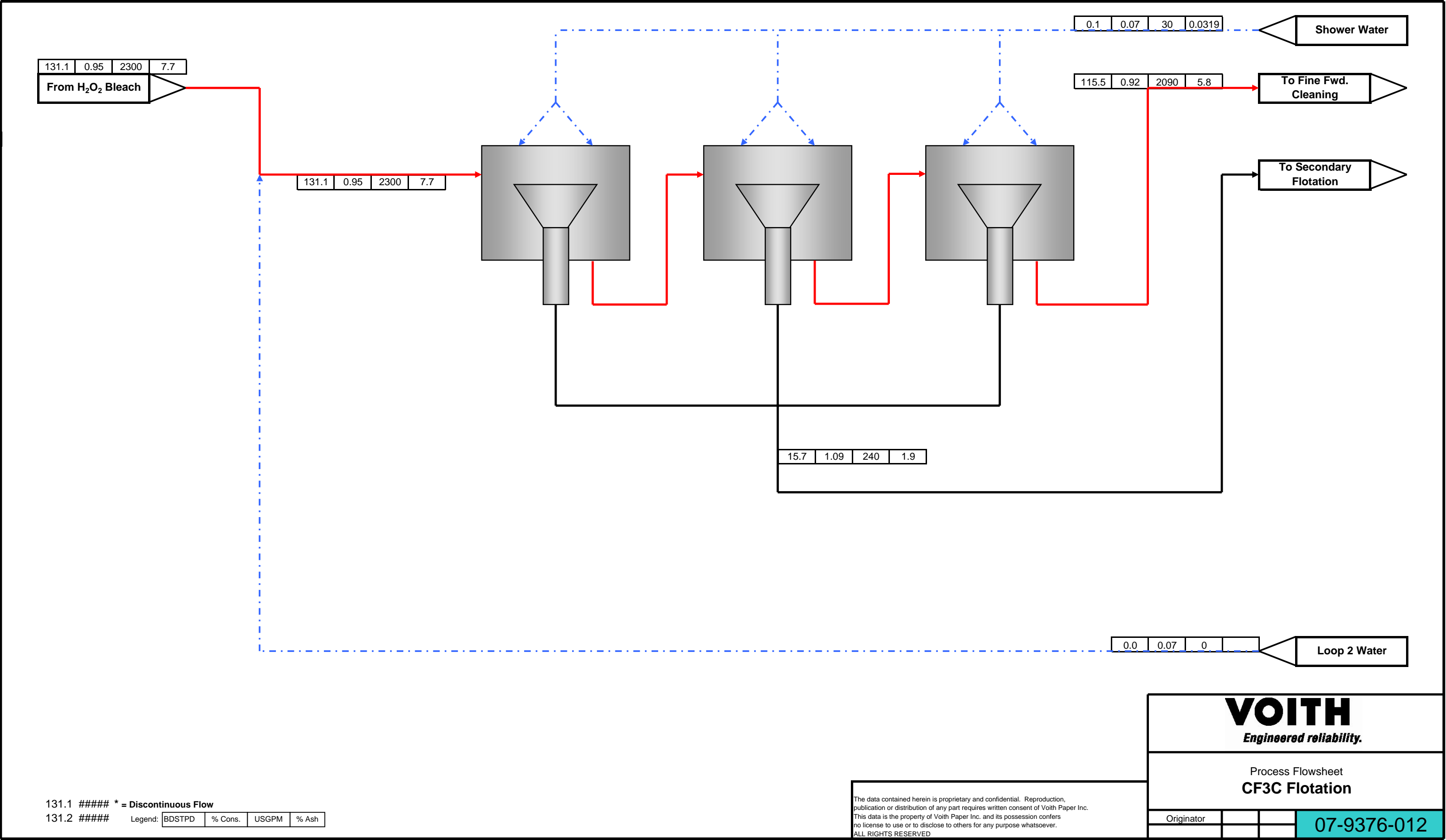
VOITH
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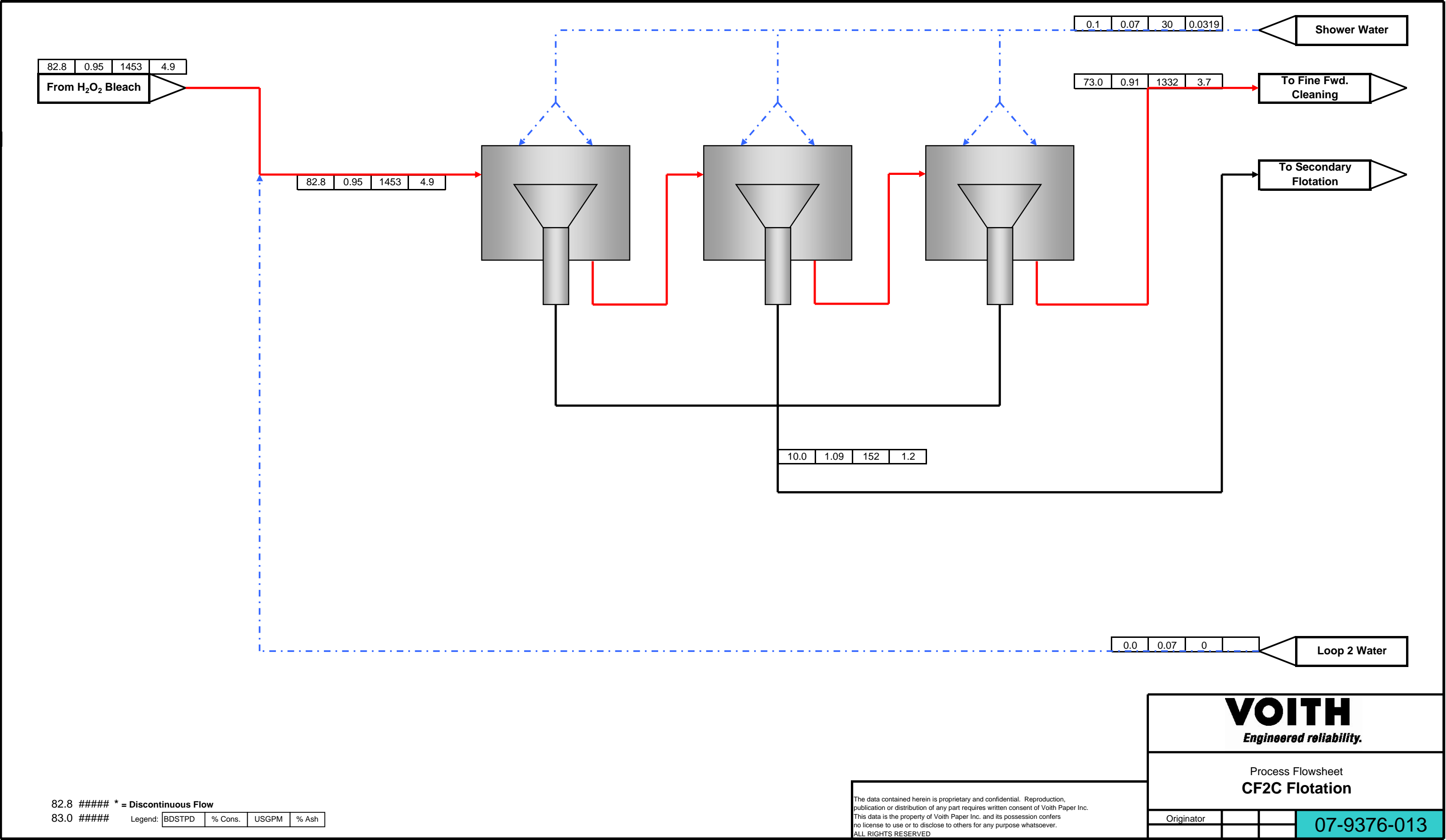
Process Flowsheet
DISPERSION SYSTEM

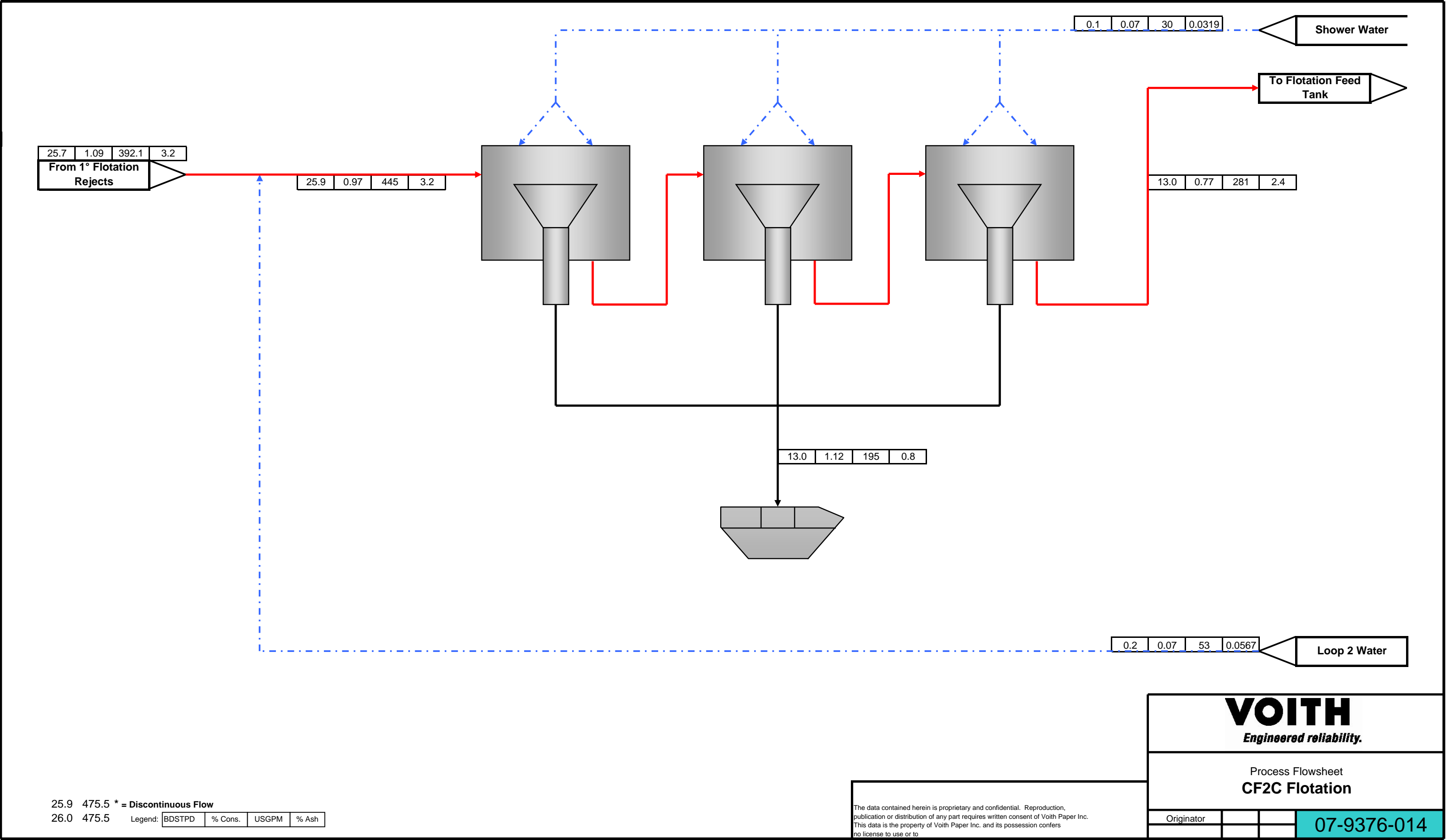
Originator			07-9376-009

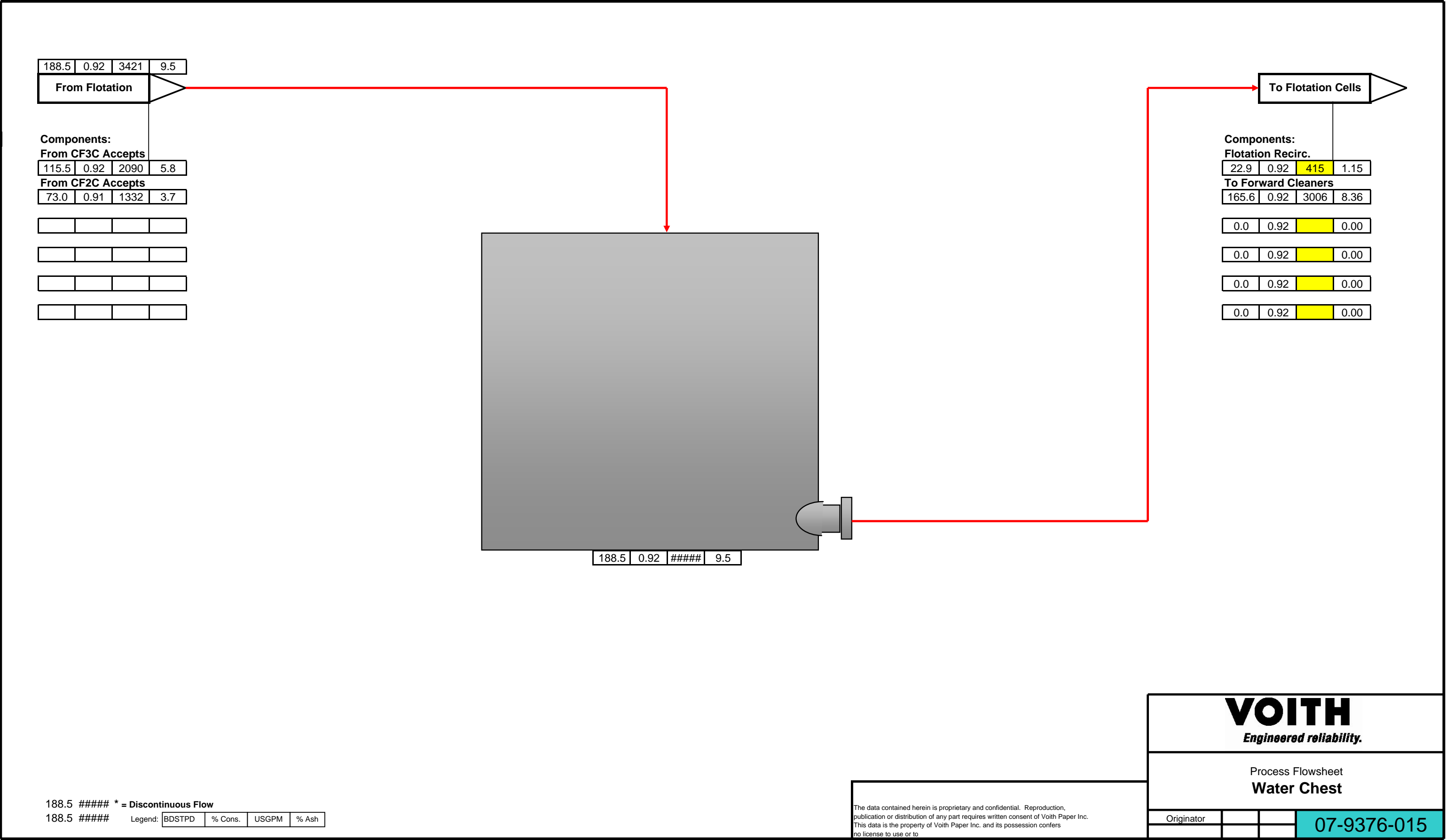


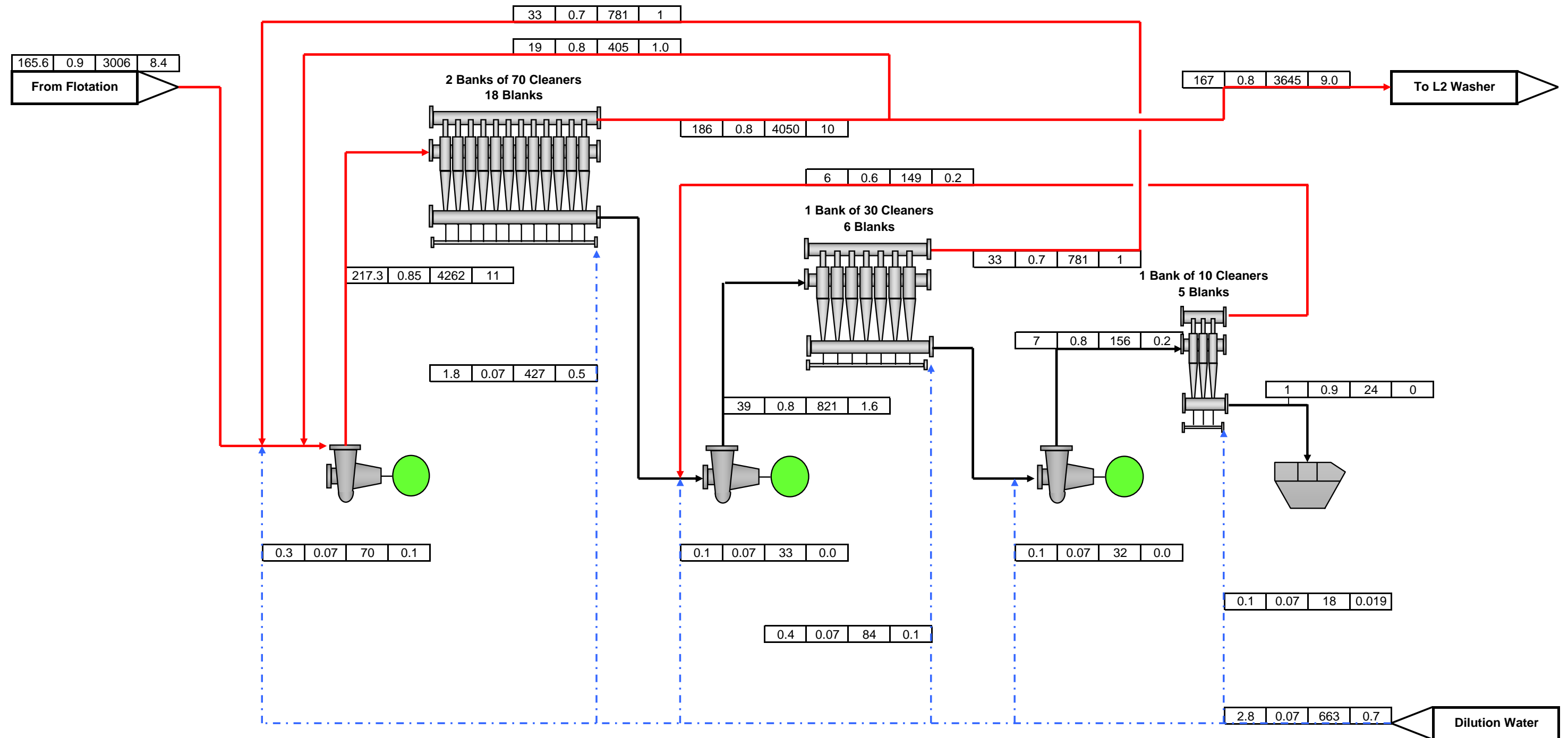












168.4 ##### * = Discontinuous Flow

168.4 ##### Legend:

BDSTPD	% Cons.	USGPM	% Ash
--------	---------	-------	-------

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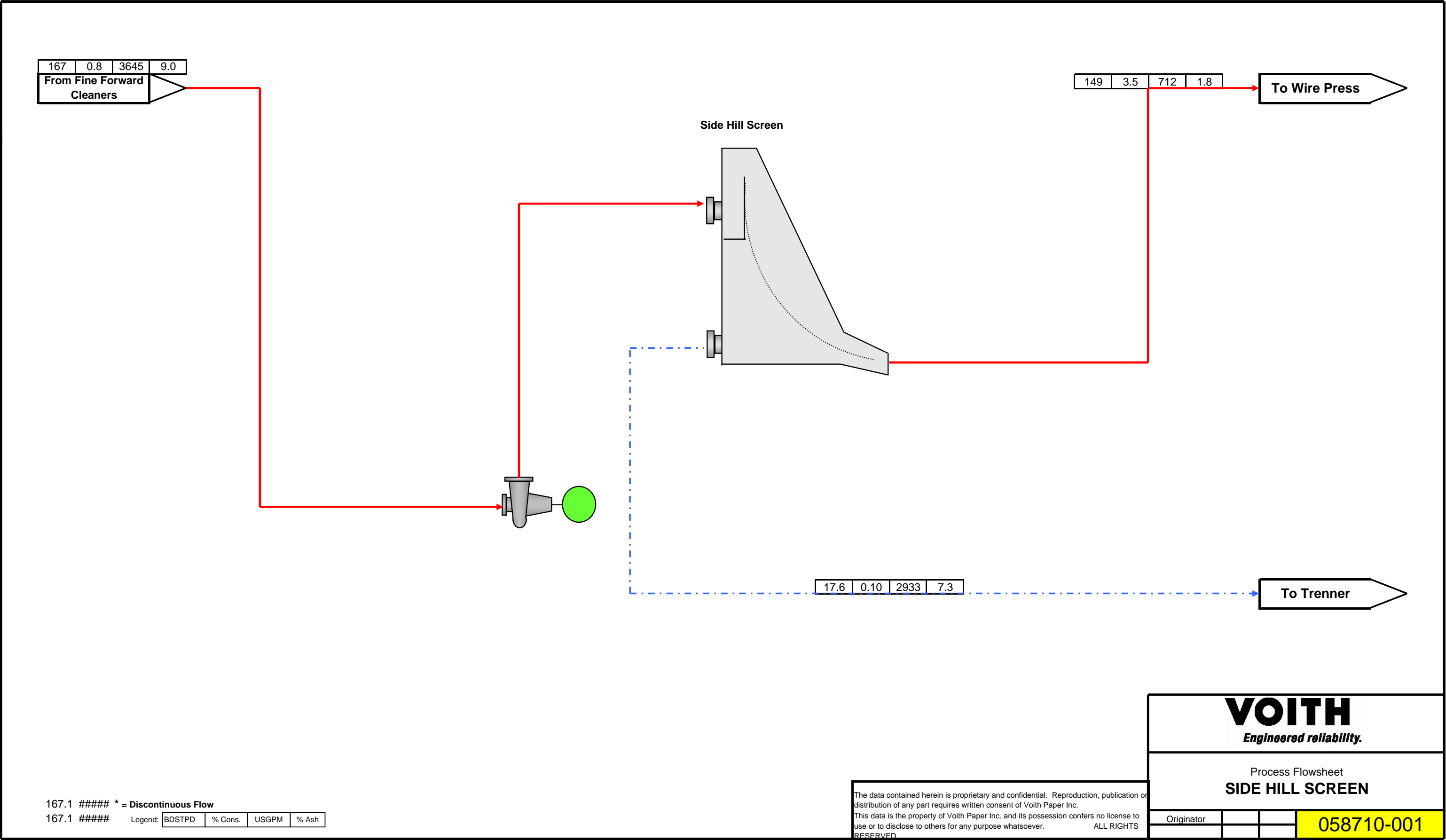
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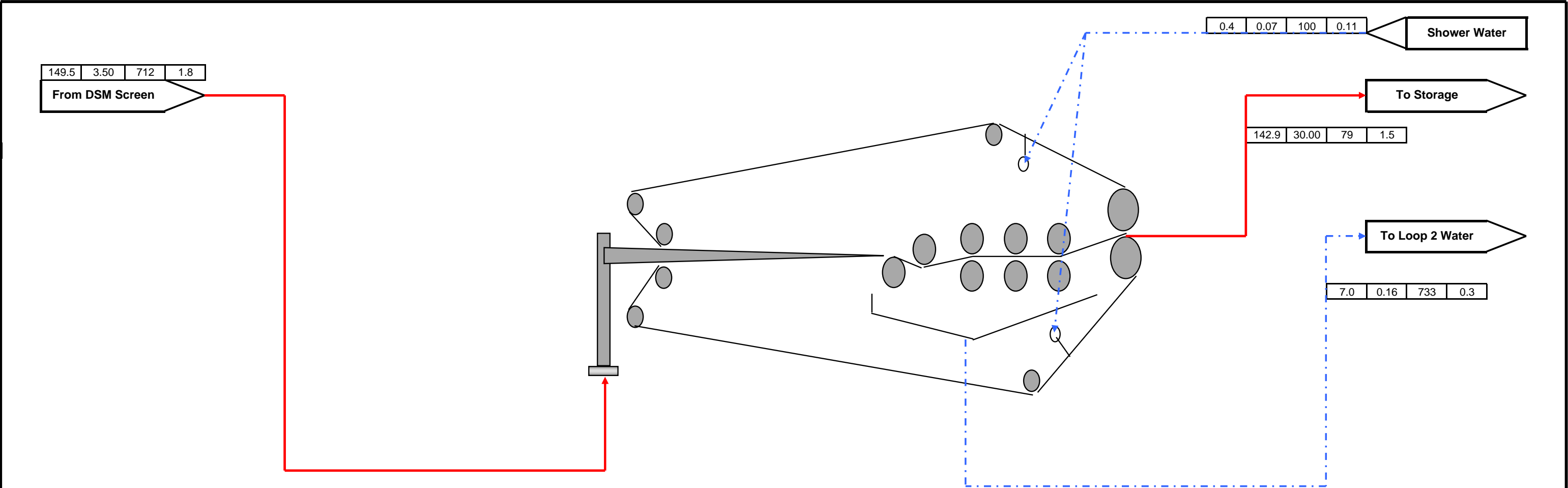
VOITH
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Process Flowsheet

KS-60 EcoMizer CLEANER SYSTEM

Originator			07-9376-016





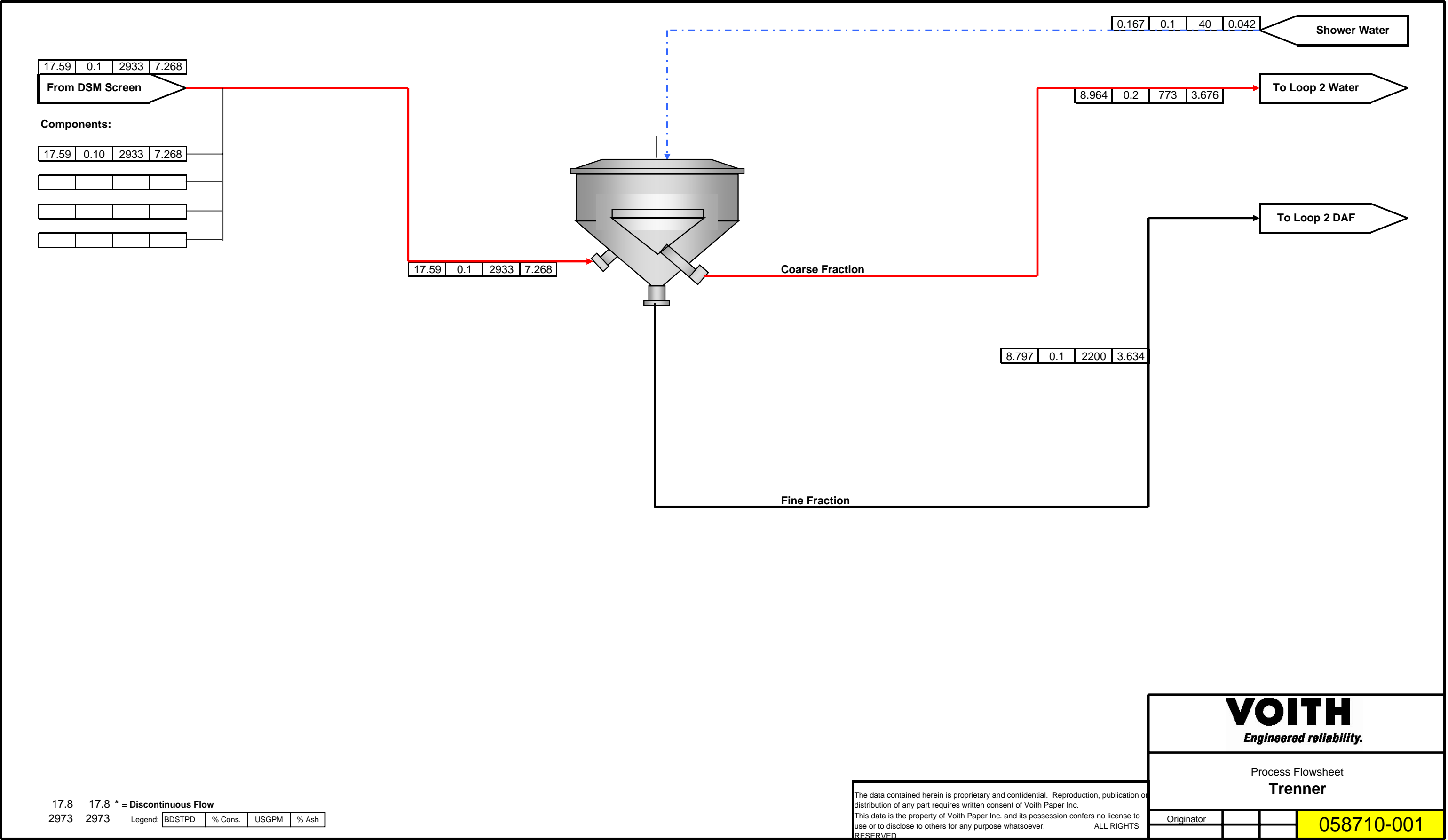
149.9 811.9 * = Discontinuous Flow
149.9 811.9 Legend: BDSTPD % Cons. USGPM % Ash

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Process Flowsheet
TWIN WIRE PRESS

Originator			058710-001



33.15	0.2	3560	27.08
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From Previous

Components:

From Loop 1 Washer

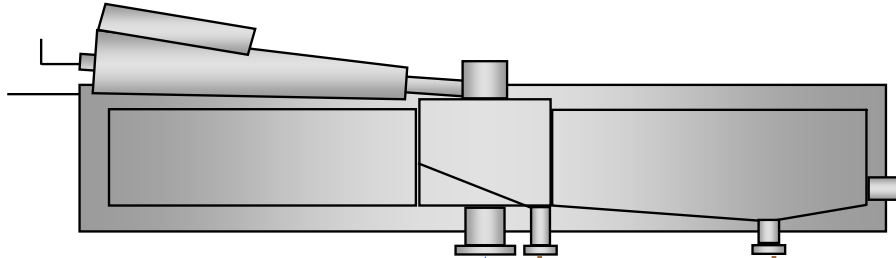
33	0.2	3560	27.1
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Deltapurge, Model NG 125



33.15	0.2	3560	27.08
-------	-----	------	-------

2.032	0.01	3387	1.663
-------	------	------	-------

31.11	3	172.9	25.42
-------	---	-------	-------

0.003	1	0.055	0.003
-------	---	-------	-------

Effluent Treatment

To Loop 1 Clear Water

33.1 3560 * = Discontinuous Flow

33.1 3560 Legend: BDSTPD % Cons. USGPM Ton Ash

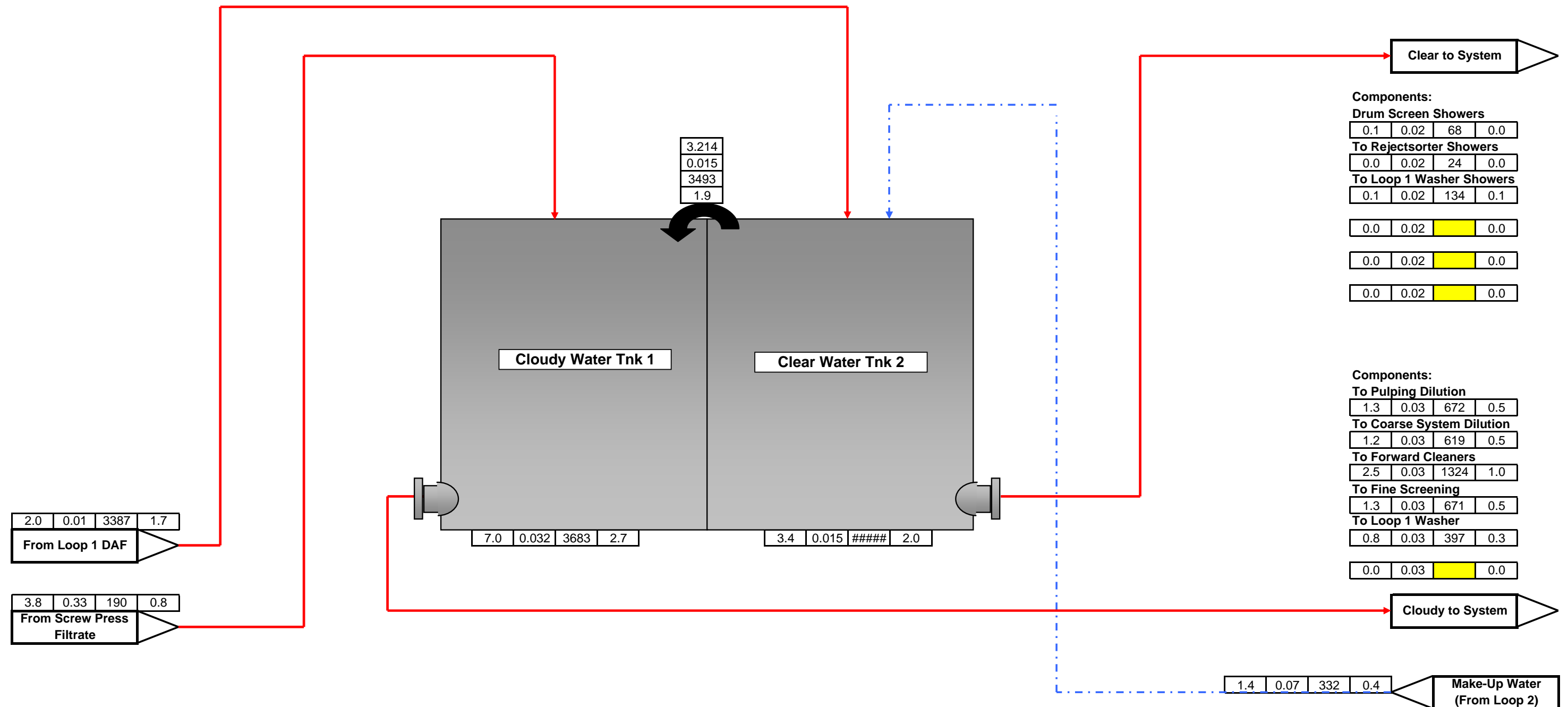
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Process Flowsheet
DELTAPURGE NG

Originator

07-9376-018



7.2 ##### * = Discontinuous Flow

7.2 #####

Legend:

BDSTPD	% Cons.	USGPM	% Ash
--------	---------	-------	-------

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Process Flowsheet

Water Chest

Originator

07-9376-019

8.797	0.1	2200	3.634
-------	-----	------	-------

From Previous

Components:

--	--	--	--

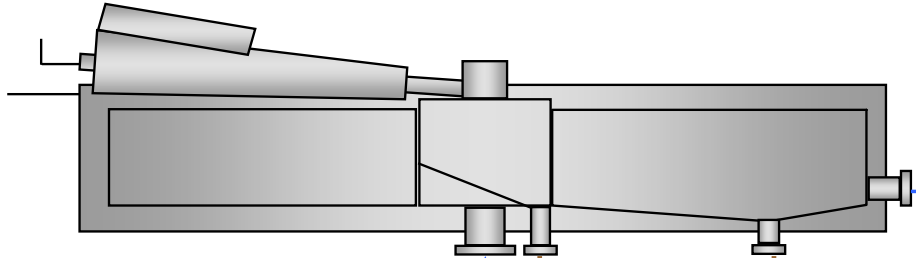
From Trenner Short Fraction

8.797	0.067	2200	3.634
-------	-------	------	-------

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Deltapurge, Model NG 80



8.797	0.1	2200	3.634
-------	-----	------	-------

1.295	0.01	2158	0.535
-------	------	------	-------

7.501	3	41.68	3.099
-------	---	-------	-------

9E-04	1	0.015	4E-04
-------	---	-------	-------

Effluent Treatment

To Loop 2 Clear Tank

8.8 2200 * = Discontinuous Flow

8.8 2200 Legend: BDSTPD % Cons. USGPM Ton Ash

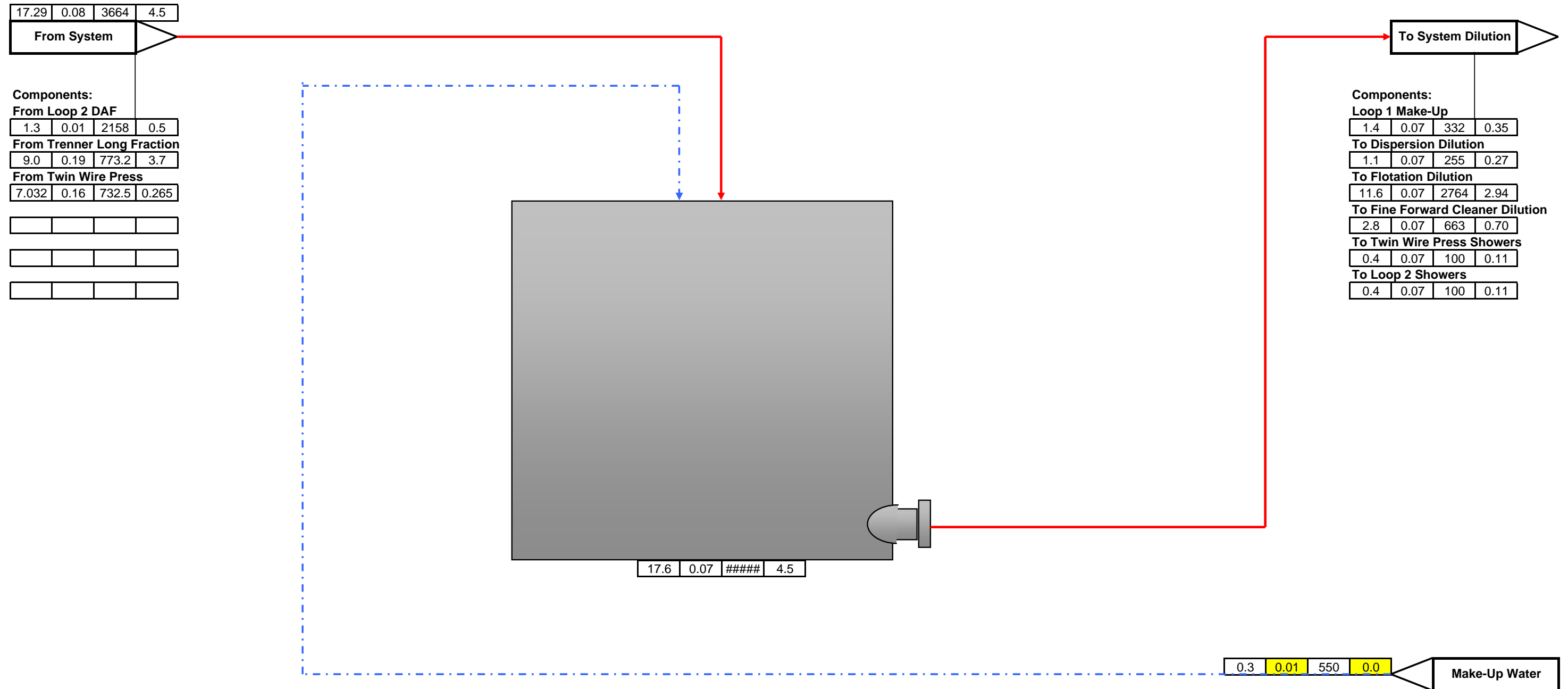
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Process Flowsheet
DELTAPURGE NG

Originator

07-9376-020



17.6 ##### * = Discontinuous Flow

17.6 ##### Legend:

BDSTPD	% Cons.	USGPM	% Ash
--------	---------	-------	-------

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Process Flowsheet

Water Chest

Originator

07-9376-021



Voith Paper

Our reference: C. Laska
Tel. Extension: 2411
Date: 2007-01-29
e-mail: chris.laska
@voith.com

Equipment Specifications

Codeword	Oconto Falls
Proposal No.	092-FS07-9376-00
Section	3

Oconto Falls
092-FS07-9376-00

Equipment Specifications
Section 3
Page 1

Table of Contents

3	Equipment Specifications
3.1	Blade Rotor 316L HD.S 32
3.2	High Density Cleaner, Model HDC 12-850
3.3	MultiSorter, Model MSM 05/05-LR
3.4	Celleco 350 to EcoMizer Retrofit
3.5	MultiScreen, Model MSS 12/12
3.6	MultiScreen, Model MSS 06/06
3.7	Centrisorter, Model ST 400 Retrofit
3.8	Compact Washer, Model CW2500
3.9	Thune Screw Press, Model SP70L SH
3.10	Equalizing Screw Conveyor, Model SEG250S-500.4500
3.11	High Temperature Disperger, Model HTD250ED
3.12	EcoCell Flotation System
3.13	KS 60 Cleaner System with EcoMizer – 2 Stage
3.14	Conus Trenner, CT 220

Oconto Falls
092-FS07-9376-00

Equipment Specifications

Section 3
Page 2

Section 3.1

Blade Rotor 316L HD.S 32 (With Flitelets)

Quantity: 1

Upgraded design rotor blade for HD32 pulper.

*This new design incorporates cupped flitelets which allows for a decrease in slushing time due to improved fiber to fiber action.

Oconto Falls
092-FS07-9376-00

Equipment Specifications

Section 3
Page 3

Section 3.2

High Density Cleaner, HDC 12-850

Design Operating Data:

Furnish:	SOP
Location:	Coarse Cleaning
Number of Cleaners:	2
Inlet Consistency:	3.50 %
Pressure Drop at Design Flow:	23 psi (1.6 Bar)
System Accept Flow:	1432 USGPM (5422 LPM)

Design Conditions per Cleaner:

Inlet Flow:	541 USGPM (2047 LPM)
Inlet Capacity:	145 BDSTPD (131 BDMTPD)
Accept Flow:	716 USGPM (2711 LPM)
Accept Capacity:	144 BDSTPD (131 BDMTPD)
Recirculation Flow:	80 USGPM (303 LPM)
Recirculation Tons per Day:	16 BDSTPD (15 BDMTPD)

Cleaners

Cleaner is constructed in four sections with flanged connections: two piece head and body section and a two piece lower cone section.

Lower cone has 1" elutriation connection for stock control.

Upper section has 6" inlet and 6" accept ANSI 150# drilled flange connections.

Rejects are fed into a junk trap, operated on a purge cycle with isolation and dump valves.

Cylindrical junk trap has 0.5" bottom fill and top dilution connection and one 1" top vent connection.

Maximum operating pressure should not exceed 100 psi.

2 Valves

Top isolation valve is 6" air operated knife gate. Bottom dump valve is 10" air operated knife gate.

Oconto Falls
092-FS07-9376-00

Equipment Specifications
Section 3
Page 4

Controls

Automatic controls suitable for DCS hook-up are supplied: Control package includes solenoid valves, and two proximity switches on each valve. Valve air lines are hard-piped to the solenoid valves. Solenoid valves and proximity switches are mounted on the valves and terminated to a supplied junction box.

Frame

Framework is included. Headers, Inlet/Accept valves and troughs are not included.

Materials of Construction

Head and body are constructed of 316 stainless steel.

Cones are ceramic.

Junk trap material is stainless steel equipped with a sight glass.

Framework is carbon steel and painted.

Paint work applied to Voith Standard Specification.

Reference Documents

Assembly Drawing:	ZAB5-908-00470
Installation Drawing:	Similar to XAB5-904-00400
Instrumentation Drawing:	887807545
Control Schematic:	D04-407008.17

Notes to Buyer

Design and operating values stated herein are based on previous experience and the best available measurements and calculations, and are considered to be quality characteristics but not warranted properties or guarantees.

Buyer to furnish inlet and accept pressure sensing connections and gauges.

Buyer to furnish main stream controls.

Water Requirements

All water pressure to be 25 psi (1.7 Bar) above inlet.

Elutriation Water:

Minimum Flow:	20 USGPM (75 LPM)
Range:	20 – 40 USGPM (75 – 150 LPM)
Top Junk Trap Dilution:	
Minimum Flow:	3 – 10 USGPM (10 – 40 LPM)
Bottom Junk Trap Fill:	
Minimum Flow:	25 – 30 USGPM (95 – 115 LPM)

Oconto Falls
092-FS07-9376-00

Equipment Specifications
Section 3
Page 5

Section 3.3

MultiSorter, Model MSM 05/05-LR

Quantity Required: 1

Design Operating Data (per unit):

Furnish:	SOP
Application:	Coarse Screen
Location:	Primary
Design Accept Capacity:	226 BDSTPD (205 BDMTPD)
Design Accept Flow:	1424 USGPM (5390 LPM)
Inlet Consistency:	3.00 %
Reject Rate by Weight:	26 %
Reject Rate by Volume:	16 %
Motor Rating:	75 hp
Motor Speed:	1800 rpm
Empty Weight:	1,962 lb. (890 kg.)
Operating Weight:	2,734 lb. (1,240 kg.)

1 Housing

Screen housing has a maximum pressure rating of 87 psi.

The cover has a 1.5" NPT vent connection.

Inlet, Accept, Reject, and Dilution flange connections are Van Stone type (150 lb. drilled).

For pressure sensing, PMC-LT-07-SAN weld on sanitary nipples are supplied on the inlet and the accept connections. The nipple can be used with the following gauges: (A) PMC seal gauge, local readings; (B) PMC-PT-EL electronic transmitter.

1 Rotor

Lobe rotor has three (3) lobes.

Operating speed is 946 rpm.

1 Cylinder

Screen cylinder has 0.055" SFC perforations Chrome plated.

Oconto Falls
092-FS07-9376-00

Equipment Specifications
Section 3
Page 6

1 Rotating Assembly

Installed with seal assembly, upper cylindrical roller bearing and lower four point ball bearing and cylindrical roller bearing.

1 Seal

Equipped with water-injected single-acting mechanical seal, Chesterton 891, and a seal water flow meter with gauge and an electrical alarm. Seal requires 1 gpm of water at a pressure of 30 psi above the stock inlet pressure. Seal water must be filtered to have all solids larger than 50 microns removed.

1 Drive

Separate vertical motor mounting plate with threaded rod adjustment is included.

One V-belt drive including belts, sheaves, and OSHA approved guard with inspection door is provided.

Special Tools

One tool set per order is supplied which includes the following items: basket lifting tool, rotor extraction tool, and lifting eye bolts.

Unit is equipped with BNC analyzer hook-up for remote mounted piezoelectric accelerometer for monitoring upper and lower bearing vibration.

Materials of Construction

Non-wetted Parts: Steel or cast iron painted to Standard
Voith Paint Specification

Wetted Parts: 316L stainless steel or equivalent

Reference Documents

Dimension Sheet: MSS 05/05-04

Control Schematic: D04-407008.33

Notes to Buyer

Design and operating values stated herein are based on previous experience and the best available measurements and calculations, and are considered to be quality characteristics but not warranted properties or guarantees.

Buyer to supply motor: 75 hp, 1800 rpm, 365T frame, with 1.15 SF with standard torque characteristics suitable for vertical, shaft-down foot mounting.

Soleplates and anchor bolts are to be supplied by the buyer.

The rotating assembly can be removed from the unit without removing the driven sheave.

Dilution water to be added through the reject dilution connection at a pressure of 15 psi above the stock inlet and at a maximum flow rate of 150 gpm.

Oconto Falls
092-FS07-9376-00

Equipment Specifications
Section 3
Page 7

Recommended stock inlet pressure, psi:

Optimum: 30 psi

Case Maximum: 87 psi

Minimum: 25 psi

Buyer to supply cover vent valve.

Buyer to furnish proper controls.

Optional Items

Heavy material inlet trap connection, not included in price.

Oconto Falls
092-FS07-9376-00

Equipment Specifications
Section 3
Page 8

Section 3.4

Celleco 350 to EcoMizer Retrofit

Design Operating Data:

Furnish:	SOP
Location:	Forward Cleaning
Inlet Flow per Cleaner:	118 gpm (447 LPM)
Pressure Drop at Inlet Flow:	21 psi (1.5 Bar)
Stage:	Primary
Number of Cleaners	37
Inlet Consistency:	1.4 %
Reject Rate, By Weight:	15 %
Reject Rate, By Volume:	14.85 %
Thickening Factor	1.01
Stage:	Secondary
Number Of Cleaners	8
Inlet Consistency:	1.2 %
Reject Rate, By Weight:	17%
Reject Rate, By Volume:	15.18 %
Thickening Factor:	1.12
Stage:	Tertiary
Number Of Cleaners	2
Inlet Consistency:	1.1 %
Reject Rate, By Weight:	18%
Reject Rate, By Volume:	16.82 %
Thickening Factor:	1.07

Retrofit of Celleco 350 Cleaner on Existing Cleaner System

Cleaners are existing. Primary and secondary retrofits include new polyurethane cones and EcoMizer section. Tertiary retrofits include ceramic cone and EcoMizer section.

EcoMizer Section

Lower cones with rejects outlet and internal elutriation water inlet. Outlet bolts to screw in reject tip.

Oconto Falls
092-FS07-9376-00

Equipment Specifications
Section 3
Page 9

Rejects are fed into a pressurized reject header. Buyer to supply reject header, elutriation water header and controls.

Maximum operating pressure should not exceed 60 psi at 160° F.

Materials of Construction

Elutriation section constructed of fiberglass reinforced nylon 6,12 and 316 SS.

Lower cone is polyurethane or ceramic (tertiary stage).

Reference Documents

Installation Drawings: 887804465

Control Drawing: 887398897

Notes to Buyer

Design and operating values stated herein are based on previous experience and the best available measurements and calculations, and are considered to be quality characteristics but not warranted properties or guarantees.

Buyer to add or modify existing rejects and elutriation headers.

Buyer to install proper controls.

Water Requirements

Maximum Elutriation Pressure: 60 psi (4.1 Bar)

Minimum Elutriation Pressure: 20 psi (1.4 Bar) greater than accept pressure

Maximum Elutriation Temperature: 130° F

Elutriation Flow: 10% of inlet flow

Oconto Falls
092-FS07-9376-00

Equipment Specifications
Section 3
Page 10

Section 3.5

MultiScreen, Model MSS 12/12

Quantity Required: 1

Design Operating Data (per unit):

Furnish:	SOP
Application:	Fine Screening
Location:	Primary
Design Accept Capacity:	281 BDSTPD (255 BDMTPD)
Design Accept Flow:	4614 USGPM (17,466 LPM)
Inlet Consistency:	1.10 %
Passing Velocity:	4.1 f/s (1.2 m/s)
Reject Rate by Weight:	20 %
Reject Rate by Volume:	13 %
Motor Rating:	200 hp
Motor Speed:	900 rpm
Empty Weight:	14,110 lb. (6,400 kg.)
Operating Weight:	23,810 lb. (10,800 kg.)

1 Housing

Screen housing has a maximum pressure rating of 87 psi.

The cover has a 1.5" NPT vent connection.

Inlet, Accept, Reject, and Dilution flange connections are Van Stone type (150 lb. drilled).

For pressure sensing, PMC-LT-07-SAN weld on sanitary nipples are supplied on the inlet and the accept connections. The nipple can be used with the following gauges: (A) PMC seal gauge, local readings; (B) PMC-PT-EL electronic transmitter.

1 Rotor

MultiFoil low pulse rotor has thirty-three (33) staggered foils on eleven (11) rows.

Operating speed is 256 rpm.

1 Cylinder

Screen cylinder has 0.15 mm 12° C-bar slots Chrome plated.

Oconto Falls
092-FS07-9376-00

Equipment Specifications
Section 3
Page 11

1 Rotating Assembly

Installed with seal assembly, upper cylindrical roller bearing and lower four point ball bearing and cylindrical roller bearing.

1 Seal

Equipped with water-injected single-acting mechanical seal, Chesterton 891, and a seal water flow meter with gauge and an electrical alarm. Seal requires 1 gpm of water at a pressure of 30 psi above the stock inlet pressure. Seal water must be filtered to have all solids larger than 50 microns removed.

1 Drive

Separate vertical motor mounting plate with threaded rod adjustment is included.

One V-belt drive including belts, sheaves, and OSHA approved guard with inspection door is provided.

Special Tools

One tool set per order is supplied which includes the following items: basket lifting tool, rotor extraction tool, and lifting eye bolts.

Unit is equipped with BNC analyzer hook-up for remote mounted piezoelectric accelerometer for monitoring upper and lower bearing vibration.

Materials of Construction

Non-wetted Parts: Steel or cast iron painted to Standard
Voith Paint Specification

Wetted Parts: 316L stainless steel or equivalent

Reference Documents

Dimension Sheet: MSS 12/12-00

Control Schematic: D04-407008.33

Notes to Buyer

Design and operating values stated herein are based on previous experience and the best available measurements and calculations, and are considered to be quality characteristics but not warranted properties or guarantees.

Buyer to supply motor: 200 hp, 900 rpm, 449T frame, with 1.15 SF with standard torque characteristics suitable for vertical, shaft-down foot mounting.

Soleplates and anchor bolts are to be supplied by the buyer.

The rotating assembly can be removed from the unit without removing the driven sheave.

Dilution water to be added through the reject dilution connection at a pressure of 15 psi above the stock inlet and at a maximum flow rate of 400 gpm.

Oconto Falls
092-FS07-9376-00

Equipment Specifications
Section 3
Page 12

Recommended stock inlet pressure, psi:

Optimum: 30 psi

Case Maximum: 87 psi

Minimum: 25 psi

Buyer to supply cover vent valve.

Buyer to furnish proper controls.

Oconto Falls
092-FS07-9376-00

Equipment Specifications
Section 3
Page 13

Section 3.6

MultiScreen, Model MSS 06/06

Quantity Required: 1

Design Operating Data (per unit):

Furnish:	SOP
Application:	Fine Screening
Location:	Secondary
Design Accept Capacity:	67 BDSTPD (61 BDMTPD)
Design Accept Flow:	1385 USGPM (5242 LPM)
Inlet Consistency:	0.90 %
Passing Velocity:	4.1 f/s (1.3 m/s)
Reject Rate by Weight:	22 %
Reject Rate by Volume:	13 %
Motor Rating:	60 hp
Motor Speed:	1200 rpm
Empty Weight:	3,130 lb. (1,420 kg.)
Operating Weight:	4,784 lb. (2,170 kg.)

1 Housing

Screen housing has a maximum pressure rating of 87 psi.

The cover has a 1.5" NPT vent connection.

Inlet, Accept, Reject, and Dilution flange connections are Van Stone type (150 lb. drilled).

For pressure sensing, PMC-LT-07-SAN weld on sanitary nipples are supplied on the inlet and the accept connections. The nipple can be used with the following gauges: (A) PMC seal gauge, local readings; (B) PMC-PT-EL electronic transmitter.

1 Rotor

MultiFoil low pulse rotor has eighteen (18) staggered foils on six (6) rows.

Operating speed is 463 rpm.

1 Cylinder

Screen cylinder has 0.15 mm 12° C-bar slots Chrome plated.

Oconto Falls
092-FS07-9376-00

Equipment Specifications
Section 3
Page 14

1 Rotating Assembly

Installed with seal assembly, upper cylindrical roller bearing and lower four point ball bearing and cylindrical roller bearing.

1 Seal

Equipped with water-injected single-acting mechanical seal, Chesterton 891, and a seal water flow meter with gauge and an electrical alarm. Seal requires 1 gpm of water at a pressure of 30 psi above the stock inlet pressure. Seal water must be filtered to have all solids larger than 50 microns removed.

1 Drive

Separate vertical motor mounting plate with threaded rod adjustment is included.

One V-belt drive including belts, sheaves, and OSHA approved guard with inspection door is provided.

Special Tools

One tool set per order is supplied which includes the following items: basket lifting tool, rotor extraction tool, and lifting eye bolts.

Unit is equipped with BNC analyzer hook-up for remote mounted piezoelectric accelerometer for monitoring upper and lower bearing vibration.

Materials of Construction

Non-wetted Parts: Steel or cast iron painted to Standard
Voith Paint Specification

Wetted Parts: 316L stainless steel or equivalent

Reference Documents

Dimension Sheet: MSS 06/06-03

Control Schematic: D04-407008.33

Notes to Buyer

Design and operating values stated herein are based on previous experience and the best available measurements and calculations, and are considered to be quality characteristics but not warranted properties or guarantees.

Buyer to supply motor: 60 hp, 1200 rpm, 404T frame, with 1.15 SF with standard torque characteristics suitable for vertical, shaft-down foot mounting.

Soleplates and anchor bolts are to be supplied by the buyer.

The rotating assembly can be removed from the unit without removing the driven sheave.

Dilution water to be added through the reject dilution connection at a pressure of 15 psi above the stock inlet and at a maximum flow rate of 200 gpm.

Oconto Falls
092-FS07-9376-00

Equipment Specifications
Section 3
Page 15

Recommended stock inlet pressure, psi:

Optimum: 30 psi

Case Maximum: 87 psi

Minimum: 25 psi

Buyer to supply cover vent valve.

Buyer to furnish proper controls.

Oconto Falls
092-FS07-9376-00

Equipment Specifications
Section 3
Page 16

Section 3.7

Centrisorter[®], Model ST 400 Retrofit

Quantity Required: 1

Design Operating Data (per unit):

Furnish:	SOP
Application:	Fine Screening
Location:	Tertiary
Design Capacity:	14.8 BDSTPD (13.4 BDMTPD)
Design Flow:	439 USGPM (1661 LPM)
Inlet Consistency:	0.65%
Passing Velocity:	4.5 f/s (1.36 m/s)
Reject Rate by Weight:	24%
Reject Rate by Volume:	12%
Motor Rating:	75hp
Motor Speed:	1200 rpm

1 FiberLoop

FiberLoop reject recirculation connection.

1 Rotor

MultiFoil rotor has twenty one (21) staggered energy efficient pulse generating foils.
Operating speed is 630 rpm.

1 Cylinder

Screen cylinder has 0.15 mm C-bar SQE slots, chrome plated.

Materials of Construction

Non-wetted Parts:	Steel or cast iron painted to Standard Voith Paint Specification
Wetted Parts:	Fabrications – 316L stainless steel Screen Cylinder – 316 stainless steel

Reference Documents

Dimension Sheet:	ST400-00
Control Schematic:	FD0-914-00540

Oconto Falls
092-FS07-9376-00

Equipment Specifications
Section 3
Page 17

Notes to Buyer

Design and operating values stated above are based on previous experience and the best available measurements and calculations, and are considered to be quality characteristics but not warranted properties or guarantees.

After inspection, if further modifications and/or rework is required, or if some existing parts do not need to be replaced, Voith reserves the right to submit a revised proposal to cover any additional rework expense or deduction.

Buyer to supply motor: 75 hp, 1200 rpm, 444T frame, with 1.15 SF with standard torque characteristics suitable for vertical, shaft-down foot mounting.

Dilution water to be added across from rejects connection at a rate up to 150 gpm at a pressure of 15 psi above stock inlet.

Buyer to furnish proper controls.

Oconto Falls
092-FS07-9376-00

Equipment Specifications
Section 3
Page 18

Section 3.8

Compact Washer CW2500

Quantity Required: 1

Operating Data per Unit:

Inlet Mass Flow:	190 BDSTPD
Inlet Consistency:	0.91%
Inlet Volume Flow:	3483 GPM
Inlet Ash Content (525° C, Tappi T 211):	16.8%
Accept Mass Flow (Accept):	148 BDSTPD
Accept Consistency:	10 %
Ash Content in Accept:	4.5%
Filtrate Volume Flow:	3236 GPM
Filtrate Consistency:	0.22%
Headbox Width:	~2150 mm
Wire Width:	2460 mm
Wire Speed:	500 – 900 m/min
Motor Speed @ 60/50 Hz	980/1180 l/min
Motor Rating:	100 hp (75 kW)
Weight of Heaviest Piece:	4629 lb. (2100 kg.)

The Exact operating data depends on quality parameters of raw material, e.g. content of fiber, fines and ash (Bauer McNett), inlet consistencies and wire used. The above values are indicative and subject to variations with the raw material mixture supplied to the machine.

1 Basic Machine

- (1) Frame of carbon steel painted, with supports for pillow blocks and integrated stainless steel filtrate tray with stock discharge through opening under the machine.
- (1) Cantilever beam of carbon steel painted to be mounted outside of the machine for wire change.
- (1) Hood with inspection windows. Equipped with lifting points for wire changing.
- (1) Drive roll covered with hard rubber.
- (1) Grooved Breast roll covered with polyurethane. Roll support with, heavy duty bearings mounted in pillow blocks.
- (1) Oscillating, non-contacting stainless steel doctor blade located on the couch roll.

Oconto Falls
092-FS07-9376-00

Equipment Specifications
Section 3
Page 19

(1) Oscillating high pressure shower for wire cleaning, 20 bar, 84-105 l/min fresh water (01) fixed low pressure shower, 0.6 bar, 30 l/min fresh water.

(1) Stock distributor with adjustable gap of stainless steel with inserts of polyurethane fixed in an pivotable and laterally adjustable support.

(1) Wire tensioning device with gear screw jacks. Wire is guided by (02) belts attached to the wire.

(1) Extraction screw for thickened stock with gear drive.

(1) Multi layer wire.

(1) Local Control panel with operating and monitoring equipment for: main drive, LP + HP shower, wire tension alarm and wire run error alarm. 24V Electric controls.

Note: frequency converter for main drive is not included!

1 Drive Set (Without Motor)

Machine sheave and motor sheave of cast iron equipped with conical bushes, with „V“ belts and protection guard.

Note: Frequency converter for main drive is not included and must be supplied by customer.

1 Set Fastening Elements

With foundation blocks, with the corresponding fastening elements.

Oconto Falls
092-FS07-9376-00

Equipment Specifications
Section 3
Page 20

Section 3.9

Thune Screw Press, Model SP-70L

Quantity Required: 1

Design Operating Data (per unit):

Furnish:	SOP
Application:	Screw Thickening
Location:	Pre Dispersion
Design Inlet Capacity:	236 BDSTPD (214 BDMTPD)
Design Inlet Flow:	394 GPM (1490 LPM)
Inlet Consistency:	10 %
Outlet Consistency:	30 %
Filtrate Consistency:	0.33 %
pH:	7.0
Temperature:	110° F (43° C)
Inlet Ash Content:	4%
Inlet Freeness:	450 mL CSF
Motor Rating:	200 hp
Motor Speed:	1800 rpm

General

The screw press consists of a 700 mm (27.6 in.) diameter screw surrounded by perforated screen baskets. The screw press unit is generally of modularized cast construction. Screen perforations are step drilled, and screen plate surfaces are electro-deburred.

“L” Model Basket Arrangement

- 1 Inlet Chamber Screen (#1)
- 2 Draining Section Screen Baskets (#2 and 3)
- 1 Compression Section Backing Shell and Screen Plate (#4)
- 1 Internal Screen Plate (#5)

1 Inlet Chamber

A half cylinder screen plate with 1.5 mm step drilled holes and 17.3% open area.

Oconto Falls
092-FS07-9376-00

Equipment Specifications
Section 3
Page 21

2 Draining Sections

Draining section screens are rolled for roundness and seam welded, and they are bolt flanged at each end for easy removal. The baskets have 1.5 mm step drilled holes with an overall open area of 17.3%.

1 Compression Section

This high compression section consists of a heavy backing shell and a screen plate. Both the backing shell and the interior screen plate are split longitudinally to simplify inspection of the screw. The backing shell is flanged. The screen plate has 1.5 mm conical drilled holes and the backing shell has 10 mm holes.

1 Internal Screen

The internal screen is located on the screen shaft, perforations are 1.2 mm and the open area is 22.7%.

1 Discharge Chamber

The discharge chamber forms the supporting structure for the SKF radial and thrust bearings, and includes the counter-pressure system.

1 Counter-Pressure System

This is a ring around the screw shaft of pneumatically actuated metal flappers. The flappers apply a counter-pressure to the discharging thick stock so that a stock plug is maintained in the pressing section. The counter-pressure system ensures a constant outlet consistency.

Air requirements: 1.5 lpm at 4 Bar (58 psig) maximum. Includes air line adaptor North American standards.

1 HiCap™ Press Screw

The geometry of the HiCap™ screw has been optimized to provide optimum transport efficiency and drainage. The press screw is fabricated. The screw shaft in the draining section has a single flight. The final flights of the screw are equipped with replaceable WearLess segments.

1 Inlet Bearing

The press screw is supported by a spherical roller bearing at the inlet end. The inlet end bearing is protected from stock seepage by a separate stuffing box housing with lip seals that release towards the inlet chamber. Continuous seal water flow requirement at the inlet end is 6 – 10 lpm (1.3 – 2.5 USGPM) at 138 kpa (20 psi) above feed pressure. Includes seal water line adaptor for North American standards.

Oconto Falls
092-FS07-9376-00

Equipment Specifications
Section 3
Page 22

1 Outlet Bearing

The press screw is supported by heavy SKF thrust and radial roller bearings at the outlet end.

1 Local/Remote Control Panel

The press is supplied with a control panel for controlling the counter-pressure system. The control panel can be mounted locally or at some distance from the screw press.

1 Cover

A fabricated cover encases the screen plates. Inspection doors are provided at each cylinder screen plate. The doors are fastened with a wing nut arrangement.

1 Collecting Tray

A collecting tray covers the complete screen drainage area. The collecting tray has a centrally located filtrate outlet, including a North American standard flange.

1 Base Frame

The screw press is supported by a heavy beam profile construction. Only leveling and bolt down installation are required.

1 Mechanical Drive

The mechanical drive includes Metso-Santasalo parallel shaft gear reducer with safeset coupling for screw press side and flexible coupling for motor side, both with guards.

Materials of Construction

Non-Wetted Parts: Painted mild steel
Wetted Parts: 316L stainless steel

Reference Documents

Installation Drawing: D-13091D
Control Schematic: A-016074D

Notes to Customer

Design and operating values stated herein are based on previous experience and the best available measurements and calculations, and are considered to be quality characteristics but not warranted properties or guarantees.

Buyer to furnish one (1) 200 hp, 1800 rpm TEFC, Nema standard, induction motor with standard torque characteristics.

Also excluded from this equipment are soleplates, platforms, instrumentation, variable frequency drive, motor starter and electrical wiring.

Oconto Falls
092-FS07-9376-00

Equipment Specifications
Section 3
Page 23

Section 3.10

Equalizing Screw Conveyor, Model SEG250S-500.4500

Quantity Required: 1

Design Operating Data (per unit):

Furnish:	SOP
Application:	HTD ED Disperger Feed
Conveyor Design:	Inclined Transfer
Maximum Incline Angle:	40°
Design Capacity:	230.8 BDSTPD (209.4 BDMTPD)
Design Operating Consistency:	25 – 35 %
Conveyor Length:	177.2" (4,500 mm)
Conveyor Tube Diameter:	20.0" (508 mm)
Motor Rating:	20 hp

1 Housing

Housing consists of fabricated tube with inlet and discharge connections.

Unit supplied with two (2) inspection ports located near the inlet and discharge ends.

1 Screw Shaft

Variable pitch screw fabricated on a tubular shaft.

Screw conveyor shaft equipped with protective sleeves.

Screw shaft operating speed is 179 rpm.

1 Feed Chute

Chute supplied for connection of screw press outlet to equalizing screw inlet.

2 Bearing Assemblies

Pillow block style, spherical roller bearings for screw conveyor shaft support.
Bearings are grease lubricated.

1 Instrumentation Package

Zero speed switches for the detection of a stopped or stalled condition.

Oconto Falls
092-FS07-9376-00

Equipment Specifications
Section 3
Page 24

Temperature sensor included with supply.

2 Seals

Equipped with packed stuffing boxes for the screw conveyor shaft.

1 Drive

Gear motor with V-belt drive and OSHA guard.

Material of Construction

Non-Wetted Parts: 304 SS, mild steel, hot galvanized.

Wetted Parts: 316 Ti.

Notes to Buyer

Design and operating values stated herein are based on previous experience and the best available measurements and calculations, and are considered to be quality characteristics but not warranted properties or guarantees.

Buyer to furnish proper controls unless otherwise specified.

Buyer to furnish motor starter(s).

Buyer to provide structural framework to support screw conveyor unless otherwise specified.

Buyer is responsible for foundation and anchor bolts.

Buyer is responsible for the assembly and installation of the unit per the instructions contained within the operating manual.

Buyer is responsible for properly interlocking equipment per the instructions contained within the operating manual.

Oconto Falls
092-FS07-9376-00

Equipment Specifications
Section 3
Page 25

Section 3.11

High Temperature Disperger, Model HTD250ED

Quantity Required: 1

Design Operating Data (per unit):

Furnish:	SOP
Application:	Dispersion
Design Capacity:	232.3 BDSTPD (211 BDMTPD)
Design Inlet Consistency:	30 %
Design Outlet Consistency:	30 %
Dispersion Temperature:	$\leq 194^{\circ} \text{ F } (\leq 90^{\circ} \text{ C})$
Steam Requirements (approx.):	0.2 – 0.25 t steam / ton
Saturated Steam Pressure Requirements:	14.5 – 29 psi (1 – 2 Bar)
Specific Dispersion Energy Requirements (approx.):	4.5 hpd/ust (88.8 kWh/mt)
Motor Rating:	1250 hp
Motor Speed:	1200 rpm
Feed Screw Motor Rating:	7.5 hp
Gap Adjustment Motor Rating:	1.0 hp
Gap Adjustment Motor Speed:	1800 rpm
Oil Cooling Motor Rating:	2.0 hp
Oil Cooling Motor Speed:	1200 rpm
Empty Weight:	6,856 lb. (3,110 kg.)
Estimated Operating Weight:	7,892 lb. (3,580 kg.)

1 Housing

Disperger housing has a maximum pressure rating of 1.5 psi.

Disperger housing consisting of inlet flange with compensator and feed screw, outlet connection, dilution water connection, chemical injection connection, two steam injection connections and hinged cover for filling changes.

Shaft with protective sleeve, bearing housing and oil lubricated bearings.

Bearings sealed through labyrinth seals with oil return ports.

Oconto Falls
092-FS07-9376-00

Equipment Specifications
Section 3
Page 26

1 Filling Set

Consisting of one rotor filling set (eight segments) and one stator filling set (eight segments).

Filling designation is 9/2936.

Rotor operating speed is 1180 rpm.

1 Gap Adjustment Drive

Electro-mechanical drive with 1.0 hp, 1800 rpm motor to adjust the disperger gap.

Unit supplied with displacement / torque limit switch and hand wheel.

1 Feed Screw Drive

Feed screw drive consists of 7.5 hp gear motor with hollow shaft for disperger feed screw operation.

Feed screw speed is 300 rpm.

1 Oil Cooling System

Oil cooling system including 2.0 hp 1200 rpm motor, pump, coupling, filter, relief valves, temperature switch, pressure switch, flow meter, heat exchanger and support bracket for integral mounting of disperger.

Unit requires 4 gpm of water at a constant pressure of 15 psi with a temperature not to exceed 105° F.

1 Control Package

Control box without control system with operating and monitoring equipment for rotor adjustment and gap indication.

Linear variable differential transducer for gap measurement supplied.

Logic diagrams provided for software configuration. Logic diagrams for specific energy control through gap adjusting drive.

2 Seals

Equipped with packed stuffing box seals for the disperger shaft and disperger feed screw shaft. Each seal requires 0.13 gpm of water at a constant pressure of 7 psi. Seal water must be filtered to have all solids larger than 50 microns removed.

1 Foundation Set

Foundation blocks, bolts and washers for disperger installation only.

1 Drive

One drive including Flender Zapex coupling and OSHA approved guard is provided.

Oconto Falls
092-FS07-9376-00

Equipment Specifications
Section 3
Page 27

Material of Construction

Non-Wetted Parts: Steel or cast iron painted to
Standard Voith Paint Specification.
Wetted Parts: Austenitic CrNiMo 2 steel
Fillings – Austenitic CrNi steel

Reference Documents

Dimension Sheet: Dispergeranlage 6-01
HTD150_450/-D/ED-09
Brochure: Dispersion with Direct Heating

Notes to Buyer

Design and operating values stated herein are based on previous experience and the best available measurements and calculations, and are considered to be quality characteristics but not warranted properties or guarantees.

Buyer to supply motor: 1250 hp, 1200 rpm, with 1.15 SF with standard torque characteristics suitable for foot mounting.

Buyer to furnish the feed chute to the disperger and discharge chute.

Buyer to furnish proper controls unless otherwise specified.

Buyer to furnish concrete / grout foundation.

Buyer to implement logic in distributed control system.

Buyer is responsible for the assembly and installation of the unit per the instructions contained within the operating manual.

Buyer is responsible for properly interlocking equipment per the instructions contained within the operating manual.

Maximum housing pressure is 1.5 psi.

Oconto Falls
092-FS07-9376-00

Equipment Specifications
Section 3
Page 28

Section 3.12

Eco Flotation Machine, Model ECC

Quantity Required: 1

Design Operating Data (Per Unit):

Furnish:	SOP
Application:	Secondary Flotation
Design Accept Capacity:	17.2 BDSTPD (15.6 BDMTPD)
Design Accept Flow:	362 USGPM (1372 LPM)
Inlet Consistency:	0.97 %
Inlet Ash:	12.49 %
Secondary Cell Empty Weight (per cell):	3784 lb. (1700kg.)
Secondary Cell Operating Weight (per cell):	19,841 lb. (9000 kg.)

2 Secondary Cell(s), Model ECC 2/38

Each cell is enclosed and elliptical in design.

Each cell includes two (2) atmospheric air injectors. Each cell includes one (1) externally adjustable overflow reject weir, two (2) hinged manways for visual inspection of the rejects trough and one (1) aspiration orifice inspection opening. Each cell includes shower water header piping with two (2) .5" hand operated ball valves for the supplied rejects trough showers, two (2) aspiration orifice cleaning showers and two (2) weir cleaning showers with one (1) 2" Dezurik butterfly valve with pneumatic actuator and solenoid. Each cell is supplied with two (2) sets of replaceable aspiration orifices for air adjustment. Each cell requires 74 gpm of shower water at 45 psi with a maximum consistency of .1%.

6 Soleplates

Soleplates supplied for installation of the secondary flotation cells.

1 Interstage Piping Package

If multiple secondary cells are provided, interstage piping in 11 G.A., 316L stainless steel, starting with the suction piping from the second secondary cell feed pump and ending with the last secondary cell feed flange is provided.

Piping for the secondary cell system consisting of the first secondary cell feed piping, the secondary cell system accepts piping, the secondary cell system recirculation piping and rejects piping are not included in scope.

Oconto Falls
092-FS07-9376-00

Equipment Specifications
Section 3
Page 29

Materials Of Construction

Non-wetted parts:	304L SS fabrications
Wetted parts:	316L SS fabrication
Injector Inserts:	Polypropylene
Manways:	Polypropylene
Soleplates:	Mild Steel

Reference Documents

Dimension Sheet:	ECC1/38_8/44-03
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Notes To Buyer

Design and operating values stated herein are based on previous experience and the best available measurements and calculations, and are considered to be quality characteristics but not warranted properties or guarantees.

Buyer to supply shower water for the flotation cells at 45 psi
(.1% maximum consistency).

Buyer to furnish concrete bases for flotation cell support.

Buyer to furnish controls.

Secondary cell(s) can be supplied detached from primary cells upon request for an additional cost.

Buyer to furnish adequate piping supports.

Stairways and walkways can be provided for an additional cost.

Buyer is responsible for field welding and assembly.

Buyer to provide piping for first secondary cell feed piping, recirculation piping and rejects piping.

Oconto Falls
092-FS07-9376-00

Equipment Specifications
Section 3
Page 30

Section 3.12.1

Pump, Model SL380-GIV-20/25

Quantity Required: 1

Design Operating Data (per unit):

Application:	Secondary Cell Feed Pump
Flotation Cell Size:	2/38
Pump Position(s):	S1
Design Flow Rate:	1,400 gpm (5,300 lpm)
Design Pressure:	33 psi (2.3 Bar)
Motor Rating:	60 hp
Motor Speed:	1200 rpm
Empty Weight:	970 lb. (440 kg.)
Estimated Operating Weight:	1,067 lb. (484 kg.)

1 Housing

Pump housing consisting of inlet and outlet with replaceable casing nose and wear liners.

Inlet and outlet flange connections with ANSI type (150 lb.) adapters.

1 Impeller

Consisting of four vane, radial design, 380 mm diameter impeller.

Impeller operating speed is 1180 rpm.

1 Rotating Assembly

Shaft with protective sleeve of stainless steel, bearing housing, angular ball bearings and cylindrical roller bearing. Bearings are grease lubricated.

1 Seal

Equipped with packed stuffing box seal. Seal requires 0.8 gpm of water at a constant pressure of 47 psi. Seal water must be filtered to have all solids larger than 50 microns removed.

Oconto Falls
092-FS07-9376-00

Equipment Specifications
Section 3
Page 31

1 Soleplate

Soleplate for pump. Soleplate for motor and anchor bolts are to be supplied by Buyer.

1 Drive

One drive including Flender Eupex H180 coupling and OSHA approved guard is provided.

Materials of Construction

Non-Wetted Parts:	Steel or cast iron painted to Standard Voith Paint Specification 01.
Wetted Parts:	Impeller – Austenitic CrNiMo 2 Steel Wear Liners – Austenitic CrNiMo 2 Steel Shaft Sleeve – Austenitic CrNiMo 2 Steel Housing – Cast iron

Reference Documents

Dimension Sheet: SL-00

Notes to Buyer

Design and operating values stated herein are based on previous experience and the best available measurements and calculations, and are considered to be quality characteristics but not warranted properties or guarantees.

Buyer to supply motor: 60 hp, 1200 rpm, with 1.15 SF with standard torque characteristics suitable for foot mounting.

Buyer to mount and align pump, motor and coupling.

Buyer to furnish proper controls.

Buyer to furnish anchor bolts.

Buyer is responsible for the assembly and installation of the unit per the instructions contained within the operating manual.

Buyer is responsible for properly interlocking equipment per the instructions contained within the operating manual.

Oconto Falls
092-FS07-9376-00

Equipment Specifications
Section 3
Page 32

Section 3.12.2

Pump, Model HAL315-GV-30/30-85

Quantity Required: 1

Design Operating Data (per unit):

Application:	Secondary Cell Feed Pump
Flotation Cell Size:	2/38
Pump Position(s):	S2
Design Flow Rate:	1,400 gpm (5,300 lpm)
Design Pressure:	13 psi (0.9 Bar)
Motor Rating:	25 hp
Motor Speed:	900 rpm
Empty Weight:	915 lb. (415 kg.)
Estimated Operating Weight:	1,008 lb. (457 kg.)

1 Housing

Pump housing consisting of inlet and outlet with replaceable wear liners.
Inlet and outlet flange connections with ANSI type (150 lb.) adapters.

1 Impeller

Consisting of five vane, semi axial design, 315 mm diameter impeller.
Impeller operating speed is 880 rpm.

1 Rotating Assembly

Shaft with protective sleeve of stainless steel, bearing housing, angular ball bearings and cylindrical roller bearing. Bearings are grease lubricated.

1 Seal

Equipped with packed stuffing box seal. Seal requires 0.26 gpm of water at a constant pressure of 27 psi. Seal water must be filtered to have all solids larger than 50 microns removed.

1 Soleplate

Soleplate for pump. Soleplate for motor and anchor bolts are to be supplied by Buyer.

Oconto Falls
092-FS07-9376-00

Equipment Specifications
Section 3
Page 33

1 Drive

One drive including Flender EupeX H160 coupling and OSHA approved guard is provided.

Materials of Construction

Non-Wetted Parts:	Steel or cast iron painted to Standard Voith Paint Specification 01.
Wetted Parts:	Impeller – Austenitic CrNiMo 2 Steel Wear Liners – Austenitic CrNiMo 2 Steel Shaft Sleeve – Austenitic CrNiMo 2 Steel Housing – Cast iron

Reference Documents

Dimension Sheet: HAL30/30-60/70-08

Notes to Buyer

Design and operating values stated herein are based on previous experience and the best available measurements and calculations, and are considered to be quality characteristics but not warranted properties or guarantees.

Buyer to supply motor: 25 hp, 900 rpm, with 1.15 SF with standard torque characteristics suitable for foot mounting.

Buyer to mount and align pump, motor and coupling.

Buyer to furnish proper controls.

Buyer to furnish anchor bolts.

Buyer is responsible for the assembly and installation of the unit per the instructions contained within the operating manual.

Buyer is responsible for properly interlocking equipment per the instructions contained within the operating manual.

Oconto Falls
092-FS07-9376-00

Equipment Specifications
Section 3
Page 34

Section 3.12.3

Deaeration Cyclone, Model EZM600B-11.60

Quantity Required: 1

Design Operating Data (per unit):

Furnish:	SOP
Application:	Primary Cell Rejects
Design Flow Range:	132 – 1,057 USGPM (500 – 4,000 LPM)
Motor Rating:	15 hp
Motor Speed:	1200 rpm
Empty Weight:	1,000 lb. (454 kg.)
Estimated Operating Weight:	1,250 lb. (567 kg.)

1 Housing

Housing consisting of cyclone head with inlet flange and separating cone with discharge opening with baffle plate.

Mechanical foam breaker assembly with reject flange and vent flange.

Inlet, reject and vent flange connections are ANSI type (150 lb.).

1 Rotor

Shaft mounted rotor.

Deaeration rotor operating speed is 1170 rpm.

1 Drive

Siemens direct drive motor with dynamic seals.

Motor voltage is 460 volts.

Materials of Construction

Non-Wetted Parts:	Steel or cast iron painted to Standard Voith Paint Specification.
Wetted Parts:	316L stainless steel

Reference Documents

Dimension Sheet:	EZM600B_11-03
Brochure:	Deaeration Cyclone, EZM

Oconto Falls
092-FS07-9376-00

Equipment Specifications
Section 3
Page 35

Notes to Buyer

Design and operating values stated herein are based on previous experience and the best available measurements and calculations, and are considered to be quality characteristics but not warranted properties or guarantees.

Buyer to mount and align deaeration cyclone and shower water unit to tank.

Buyer to furnish stainless steel tank, per Voith Paper specifications with support for deaeration cyclone.

Buyer to furnish motor starter.

Buyer to furnish agitator for tank.

Buyer is responsible for the assembly and installation of the unit per the instructions contained within the operating manual.

Buyer is responsible for properly interlocking equipment per the instructions contained within the operating manual.

Oconto Falls
092-FS07-9376-00

Equipment Specifications
Section 3
Page 36

Section 3.13

KS 60 Cleaner System with EcoMizer

Design Operating Data:

Furnish:	SOP
Location:	Fine Forward Cleaning
Number of Stages:	2
Inlet Flow per Cleaner:	35 USGPM (132 LPM)
Pressure Drop at Inlet Flow:	30 psi (2.1 Bar)
System Design Capacity:	234 BDSTPD (212 BDMTPD)
System Design Flow:	5098 USGPM (19,297 LPM)

Primary Stage:

Inlet Consistency:	0.85 %
Reject Rate, By Weight:	15 %
*Reject Rate, By Volume:	14.62 %
*Thickening Factor:	1.03

Secondary Stage:

Inlet Consistency:	0.80 %
Reject Rate, By Weight:	17 %
*Reject Rate, By Volume:	14.65 %
*Thickening Factor:	1.16

(*Includes Elutriation)

1 Cleaner System

Cleaner system has the following configuration:

Primary Stage to have 2 modules of 100 cleaners with a total of 171 active cleaners installed and 29 blanks.

Secondary Stage to have 1 module of 40 cleaners with a total of 33 active cleaners installed and 7 blanks.

Modules

Each module is complete with inlet, accepts and rejects pipes having Van Stone 150# drilled flange pipe connections.

Oconto Falls
092-FS07-9376-00

Equipment Specifications
Section 3
Page 37

Cleaners

Each cleaner contains one (1) headpiece with accepted stock outlet, one (1) conical separating tube with stock inlet, and one (1) rejects nozzle.

Cleaner diameter is 60 mm.

Maximum operating pressure should not exceed 60 psi (4 Bar) at 160° F (70° C).

Minimum accept pressure should be 10 psi (0.7 Bar).

EcoMizer Section

Rejects outlet is equipped with internal elutriation water added axially from bottom.

Rejects are removed radially to a pressurized reject header.

Materials of Construction

HEADERS: Wetted parts are constructed of 316L module support structure supplied is constructed of 304 SS.

CLEANERS: The cleaners are constructed of Polyamide, highly resistant to wear and temperature.

Notes to Buyer

Design and operating values stated herein are based on previous experience and the best available measurements and calculations, and are considered to be quality characteristics but not warranted properties or guarantees.

Buyer to furnish inlet accepts and rejects pressure sensing connections and gauges.

Buyer to furnish controls.

If the stock pH is outside the 5-10 range, contact Voith.

Reference Documents

Dimension Sheets:

Primary Stage: KS60P-IB2.100-01

Secondary Stage: KS60P-IB2.40-01

Water Requirements

Maximum Elutriation Pressure: 60 psi (4 Bar)

Minimum Elutriation Pressure: 20 psi (1.4 Bar) greater than accept pressure

Recommended Elutriation: 2 – 4 USGPM (10 – 15 LPM)* per cleaner

*Underlined value is basis for pump sizing

Oconto Falls
092-FS07-9376-00

Equipment Specifications

Section 3
Page 38

Section 3.14

Conus Trenner 220

Process Specification

Application of 1 x Conus Trenner 220	Fiber Recovery (210 tpd option)
Description of Inlet	DSM Screen Filtrate
Feed Flow Rate	4100 gpm
Feed Consistency	1000 ppm

Performance Description

The values stated below are based on experience. The Conus Trenner has to be engineered, installed, and operated according to the supplier's specification.

Fine fraction*

Throughput	approx. 2870 - 3250 gpm
Consistency	600 ppm - 1000 ppm

Coarse fraction*

Throughput	approx. 850 - 1230 gpm
Consistency	1800 ppm - 2200 ppm

*The quality and quantity of the fine and coarse fraction depends on the mesh size of the wire and the distribution of the particle size in the inlet. The mesh size of the wire determines the throughput of fine and coarse fraction. For this application, a 150 µm mesh will be applied. The fine fraction will be almost free of particles larger than the diagonal of the applied mesh. The coarse fraction will contain the majority of the particles larger than the diagonal of the applied mesh. More specific values can be given after pilot trials. Solids content to be measured with WHATMAN filter No. 4 or 41 or black ribbon filter paper. (Tappi T656/4.1 or DIN 54359).

Oconto Falls
092-FS07-9376-00

Equipment Specifications

Section 3
Page 39

Technical data of one (1) Conus Trenner

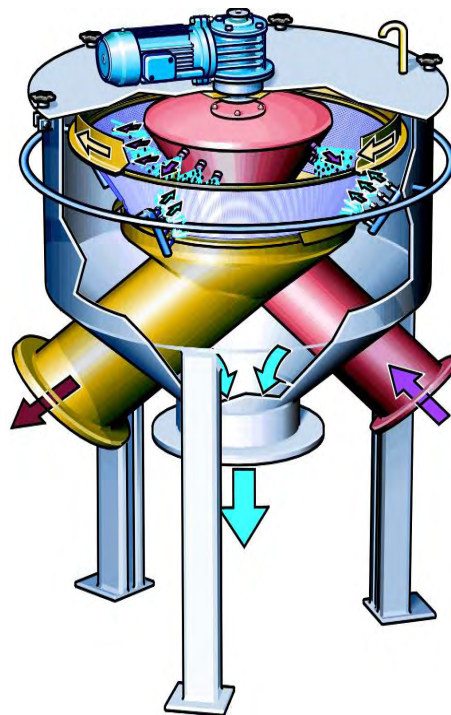
Dimensions and Drives of the Conus Trenner

Max. diameter	100 in
Max. height	209 in
Installed power	1.5 hp
Electric connection	460 V / 60 Hz \pm 10 %

Technical Description

Description of Process

The Conus Trenner is a compact, highly efficient, self-cleaning fractionator for fiber recovery, fiber scalping or filtrate fine polishing with low energy consumption. By spraying the suspension against the wire, this is split into coarse and fine fractions according to the wire opening.



Machine structure - Conical geometry

The Conus Trenner is composed of three funnel-shaped cones inside each other. The suspension is sprayed into a rotating wire basket through nozzles installed in the internal feed cone of the Conus Trenner. It enters the Conus Trenner with a pressure of approx. 1 bar (15 PSI). The retained coarse fraction, which is slightly thickened, is collected in the middle cone while the fine fraction passing through the wire is collected in the external cone.

Oconto Falls
092-FS07-9376-00

Equipment Specifications
Section 3
Page 40

This last forms the housing of the Conus Trenner. A direct gear drive is used to provide the correct rotating speed of the wire basket. The simple design of the machine equates to high reliability and quick, easy installation.

Special multiple-layer wire

The wire basket consists of a special, multiple-layer stainless steel wire installed on a conical support basket. This sturdy design of the wire prevents vibration damage and damage by abrasive particles in the feed.

Moreover the multiple-layer design enhances a more efficient fractionation reducing the loss of kinetic energy. The wire can be delivered in different openings from 40 µm to 300 µm (50 - 325 mesh).

Spray geometry

The feed nozzles are installed diagonally on the surface of the feed cone for an optimized use of the wire surface and minimised spray overlapping.

Back washing system

Inside the external cone is installed a back washing pipe with nozzles for continuous wire cleaning during operation. The back washing system washes the wire from outside to inside. The effectiveness of the back washing is enhanced by the multiple-layer design which procures a deflection of the spray water throughout all the layers.

Shower Water Consumption	62 gpm @ 45 PSI
Shower water quality	< 100 ppm < 100 µm

Exchangeable wire basket

The wire basket can be easily removed by lifting the cover of the Conus Trenner for easy service operation or wire exchange.

Materials and Surface Treatment

All wetted parts are supplied as standard in AISI 304 (1.4301) or equivalent. Wetted parts are: inlet conical distributor, Fine Fraction cone, Coarse Fraction cone, wire support basket.

The multiple-layer wire is supplied in AISI 316 (1.4401).

The Conus Trenner Options (see price list)

Recommended options

None

Other available options

Upgrade to Material AISI 316 for wetted parts



Voith Paper

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Alternates

Codeword	Oconto Falls
Proposal No.	092-FS07-9376-00
Section	4

Oconto Falls
092-FS07-9376-00

Alternates
Section 4
Page 1

Table of Contents

4	Alternates
4.1	High Density Cleaner, Model HDC 12-1200
4.2	MultiSorter, Model MSM 05/05-LR
4.3	Celleco 350 to EcoMizer Retrofit
4.4	MultiScreen, Model MSS 10/10
4.5	MultiScreen, Model MSS 06/06
4.6	Centrisorter, Model ST 400 Retrofit
4.7	Compact Washer, Model CW2000
4.8	Thune Screw Press, Model SP70L SH
4.9	EcoCell Flotation System
4.10	KS 60 Cleaner System with EcoMizer – 1 Stage
4.11	Conus Trenner, CT 150

Oconto Falls
092-FS07-9376-00

Alternates
Section 4
Page 2

Section 4.1

High Density Cleaner, HDC 12-1200

Design Operating Data:

Furnish:	SOP
Location:	Coarse Cleaning
Number of Cleaners:	1
Inlet Consistency:	3.50 %
Pressure Drop at Design Flow:	25 psi (1.7 Bar)
System Accept Flow:	207 USGPM (785 LPM)

Design Conditions per Cleaner:

Inlet Flow:	776 USGPM (2937 LPM)
Inlet Capacity:	208 BDSTPD (189 BDMTPD)
Accept Flow:	1016 USGPM (3846 LPM)
Accept Capacity:	207 BDSTPD (188 BDMTPD)
Recirculation Flow:	113 USGPM (430 LPM)
Recirculation Tons per Day:	23 BDSTPD (21 BDMTPD)

Cleaners

Cleaner is constructed in four sections with flanged connections: two piece head and body section and a two piece lower cone section.

Lower cone has 1" NPT elutriation connection for stock control.

Upper section has 6" inlet and 8" accept ANSI 150# drilled flange connections.

Rejects are fed into a junk trap, operated on a purge cycle with isolation and dump valves.

Cylindrical junk trap has 0.5" bottom fill and top dilution connection and one 1" top vent connection.

Maximum operating pressure should not exceed 100 psi.

2 Valves

Top isolation valve is 6" air operated knife gate. Bottom dump valve is 10" air operated knife gate.

Oconto Falls
092-FS07-9376-00

Alternates
Section 4
Page 3

Controls

Automatic controls suitable for DCS hook-up are supplied: Control package includes solenoid valves, and two proximity switches on each valve. Valve air lines are hard-piped to the solenoid valves. Solenoid valves and proximity switches are mounted on the valves and terminated to a supplied junction box.

Frame

Framework is included. Header, Inlet/Accepts and troughs are not included.

Materials of Construction

Head and body are constructed of 316 stainless steel.

Cones are ceramic.

Junk trap material is stainless steel equipped with a sight glass.

Framework is carbon steel and painted.

Paint work applied to Voith Standard Specification.

Reference Documents

Assembly Drawing:	ZAB5-908-00480
Installation Drawing:	Similar to ZAB5-904-00420
Instrumentation Drawing:	887807545
Control Schematic:	D04-407008.17

Notes to Buyer

Design and operating values stated herein are based on previous experience and the best available measurements and calculations, and are considered to be quality characteristics but not warranted properties or guarantees.

Buyer to furnish inlet and accept pressure sensing connections and gauges.

Buyer to furnish main stream controls.

Water Requirements

All water pressure to be 25 psi (1.7 Bar) above inlet.

Elutriation Water:

Minimum Flow:	20 USGPM (75 LPM)
Range:	20 – 40 USGPM (75 – 150 LPM)
Top Junk Trap Dilution:	
Minimum Flow:	3 – 10 USGPM (10 – 40 LPM)
Bottom Junk Trap Fill:	
Minimum Flow:	25 – 30 USGPM (95 – 115 LPM)

Oconto Falls
092-FS07-9376-00

Alternates
Section 4
Page 4

Section 4.2

MultiSorter, Model MSM 05/05-LR

Quantity Required: 1

Design Operating Data (per unit):

Furnish:	SOP
Application:	Coarse Screening
Location:	Primary
Design Accept Capacity:	162 BDSTPD (147 BDMTPD)
Design Accept Flow:	1022 USGPM (3867 LPM)
Inlet Consistency:	3.00 %
Reject Rate by Weight:	26 %
Reject Rate by Volume:	16 %
Motor Rating:	75 hp
Motor Speed:	1800 rpm
Empty Weight:	1,962 lb. (890 kg.)
Operating Weight:	2,734 lb. (1,240 kg.)

1 Housing

Screen housing has a maximum pressure rating of 87 psi.

The cover has a 1.5" NPT vent connection.

Inlet, Accept, Reject, and Dilution flange connections are Van Stone type (150 lb. drilled).

For pressure sensing, PMC-LT-07-SAN weld on sanitary nipples are supplied on the inlet and the accept connections. The nipple can be used with the following gauges: (A) PMC seal gauge, local readings; (B) PMC-PT-EL electronic transmitter.

1 Rotor

Lobe rotor has three (3) lobes.

Operating speed is 946 rpm.

1 Cylinder

Screen cylinder has 0.055" SFC perforations Chrome plated.

Oconto Falls
092-FS07-9376-00

Alternates
Section 4
Page 5

1 Rotating Assembly

Installed with seal assembly, upper cylindrical roller bearing and lower four point ball bearing and cylindrical roller bearing.

1 Seal

Equipped with water-injected single-acting mechanical seal, Chesterton 891, and a seal water flow meter with gauge and an electrical alarm. Seal requires 1 gpm of water at a pressure of 30 psi above the stock inlet pressure. Seal water must be filtered to have all solids larger than 50 microns removed.

1 Drive

Separate vertical motor mounting plate with threaded rod adjustment is included.

One V-belt drive including belts, sheaves, and OSHA approved guard with inspection door is provided.

Special Tools

One tool set per order is supplied which includes the following items: basket lifting tool, rotor extraction tool, and lifting eye bolts.

Unit is equipped with BNC analyzer hook-up for remote mounted piezoelectric accelerometer for monitoring upper and lower bearing vibration.

Materials of Construction

Non-wetted Parts: Steel or cast iron painted to Standard
Voith Paint Specification

Wetted Parts: 316L stainless steel or equivalent

Reference Documents

Dimension Sheet: MSS 05/05-04

Control Schematic: D04-407008.33

Notes to Buyer

Design and operating values stated herein are based on previous experience and the best available measurements and calculations, and are considered to be quality characteristics but not warranted properties or guarantees.

Buyer to supply motor: 75 hp, 1800 rpm, 365T frame, with 1.15 SF with standard torque characteristics suitable for vertical, shaft-down foot mounting.

Soleplates and anchor bolts are to be supplied by the buyer.

The rotating assembly can be removed from the unit without removing the driven sheave.

Dilution water to be added through the reject dilution connection at a pressure of 15 psi above the stock inlet and at a maximum flow rate of 150 gpm.

Oconto Falls
092-FS07-9376-00

Alternates
Section 4
Page 6

Recommended stock inlet pressure, psi:

Optimum: 30 psi

Case Maximum: 87 psi

Minimum: 25 psi

Buyer to supply cover vent valve.

Buyer to furnish proper controls.

Optional Items

Heavy material inlet trap connection, not included in price.

Oconto Falls
092-FS07-9376-00

Alternates
Section 4
Page 7

Section 4.3

Celleco 350 to EcoMizer Retrofit

Design Operating Data:

Furnish:	SOP
Location:	Forward Cleaning
Inlet Flow per Cleaner:	118 gpm (447 LPM)
Pressure Drop at Inlet Flow:	21 psi (1.5 Bar)
Stage:	Primary
Number of Cleaners	27
Inlet Consistency:	1.4 %
Reject Rate, By Weight:	15 %
Reject Rate, By Volume:	15 %
Thickening Factor	1.00
Stage:	Secondary
Number Of Cleaners	6
Inlet Consistency:	1.2 %
Reject Rate, By Weight:	17%
Reject Rate, By Volume:	15.45 %
Thickening Factor:	1.10
Stage:	Tertiary
Number Of Cleaners	2
Inlet Consistency:	1.1 %
Reject Rate, By Weight:	18%
Reject Rate, By Volume:	19.56 %
Thickening Factor:	0.92

Retrofit of Celleco 350 Cleaner on Existing Cleaner System

Cleaners are existing. Primary and secondary retrofits include new polyurethane cones and EcoMizer section. Tertiary retrofits include ceramic cone and EcoMizer section.

EcoMizer Section

Lower cones with rejects outlet and internal elutriation water inlet. Outlet bolts to screw in reject tip.

Oconto Falls
092-FS07-9376-00

Alternates
Section 4
Page 8

Rejects are fed into a pressurized reject header. Buyer to supply reject header, elutriation water header and controls.

Maximum operating pressure should not exceed 60 psi at 160° F.

Materials of Construction

Elutriation section constructed of fiberglass reinforced nylon 6,12 and 316 SS.

Lower cone is polyurethane or ceramic (tertiary stage).

Reference Documents

Installation Drawings: 887804465

Control Drawing: 887398897

Notes to Buyer

Design and operating values stated herein are based on previous experience and the best available measurements and calculations, and are considered to be quality characteristics but not warranted properties or guarantees.

Buyer to add or modify existing rejects and elutriation headers.

Buyer to install proper controls.

Water Requirements

Maximum Elutriation Pressure: 60 psi (4.1 Bar)

Minimum Elutriation Pressure: 20 psi (1.4 Bar) greater than accept pressure

Maximum Elutriation Temperature: 130° F

Elutriation Flow: 10% of inlet flow

Oconto Falls
092-FS07-9376-00

Alternates
Section 4
Page 9

Section 4.4

MultiScreen, Model MSS 10/10

Quantity Required: 1

Design Operating Data (per unit):

Furnish:	SOP
Application:	Fine Screening
Location:	Primary
Design Accept Capacity:	202 BDSTPD (183 BDMTPD)
Design Accept Flow:	3311 USGPM (12,533 LPM)
Inlet Consistency:	1.10 %
Passing Velocity:	4.2 f/s (1.3 m/s)
Reject Rate by Weight:	20 %
Reject Rate by Volume:	13 %
Motor Rating:	125 hp
Motor Speed:	900 rpm
Empty Weight:	8,470 lb. (3,850 kg.)
Operating Weight:	12,760 lb. (5,800 kg.)

1 Housing

Screen housing has a maximum pressure rating of 87 psi.

The cover has a 1.5" NPT vent connection.

Inlet, Accept, Reject, and Dilution flange connections are Van Stone type (150 lb. drilled).

For pressure sensing, PMC-LT-07-SAN weld on sanitary nipples are supplied on the inlet and the accept connections. The nipple can be used with the following gauges: (A) PMC seal gauge, local readings; (B) PMC-PT-EL electronic transmitter.

1 Rotor

MultiFoil low pulse rotor has thirty-three (33) staggered foils on nine (9) rows.

Operating speed is 298 rpm.

1 Cylinder

Screen cylinder has 0.15 mm 12° C-bar slots Chrome plated.

Oconto Falls
092-FS07-9376-00

Alternates
Section 4
Page 10

1 Rotating Assembly

Installed with seal assembly, upper cylindrical roller bearing and lower four point ball bearing and cylindrical roller bearing.

1 Seal

Equipped with water-injected single-acting mechanical seal, Chesterton 891, and a seal water flow meter with gauge and an electrical alarm. Seal requires 1 gpm of water at a pressure of 30 psi above the stock inlet pressure. Seal water must be filtered to have all solids larger than 50 microns removed.

1 Drive

Separate vertical motor mounting plate with threaded rod adjustment is included.

One V-belt drive including belts, sheaves, and OSHA approved guard with inspection door is provided.

Special Tools

One tool set per order is supplied which includes the following items: basket lifting tool, rotor extraction tool, and lifting eye bolts.

Unit is equipped with BNC analyzer hook-up for remote mounted piezoelectric accelerometer for monitoring upper and lower bearing vibration.

Materials of Construction

Non-wetted Parts: Steel or cast iron painted to Standard
Voith Paint Specification

Wetted Parts: 316L stainless steel or equivalent

Reference Documents

Dimension Sheet: MSS 10/10-00

Control Schematic: D04-407008.33

Notes to Buyer

Design and operating values stated herein are based on previous experience and the best available measurements and calculations, and are considered to be quality characteristics but not warranted properties or guarantees.

Buyer to supply motor: 125 hp, 900 rpm, 447T frame, with 1.15 SF with standard torque characteristics suitable for vertical, shaft-down foot mounting.

Soleplates and anchor bolts are to be supplied by the buyer.

The rotating assembly can be removed from the unit without removing the driven sheave.

Dilution water to be added through the reject dilution connection at a pressure of 15 psi above the stock inlet and at a maximum flow rate of 350 gpm.

Oconto Falls
092-FS07-9376-00

Alternates
Section 4
Page 11

Recommended stock inlet pressure, psi:

Optimum: 30 psi

Case Maximum: 87 psi

Minimum: 25 psi

Buyer to supply cover vent valve.

Buyer to furnish proper controls.

Oconto Falls
092-FS07-9376-00

Alternates
Section 4
Page 12

Section 4.5

MultiScreen, Model MSS 06/06

Quantity Required: 1

Design Operating Data (per unit):

Furnish:	SOP
Application:	Fine Screening
Location:	Secondary
Design Accept Capacity:	48 BDSTPD (44 BDMTPD)
Design Accept Flow:	994 USGPM (3761 LPM)
Inlet Consistency:	0.90 %
Passing Velocity:	4.0 f/s (1.2 m/s)
Reject Rate by Weight:	22 %
Reject Rate by Volume:	13 %
Motor Rating:	60 hp
Motor Speed:	1200 rpm
Empty Weight:	3,130 lb. (1,420 kg.)
Operating Weight:	4,784 lb. (2,170 kg.)

1 Housing

Screen housing has a maximum pressure rating of 87 psi.

The cover has a 1.5" NPT vent connection.

Inlet, Accept, Reject, and Dilution flange connections are Van Stone type (150 lb. drilled).

For pressure sensing, PMC-LT-07-SAN weld on sanitary nipples are supplied on the inlet and the accept connections. The nipple can be used with the following gauges: (A) PMC seal gauge, local readings; (B) PMC-PT-EL electronic transmitter.

1 Rotor

MultiFoil low pulse rotor has eighteen (18) staggered foils on six (6) rows.

Operating speed is 463 rpm.

1 Cylinder

Screen cylinder has 0.15 mm 12° C-bar slots Chrome plated.

Oconto Falls
092-FS07-9376-00

Alternates
Section 4
Page 13

1 Rotating Assembly

Installed with seal assembly, upper cylindrical roller bearing and lower four point ball bearing and cylindrical roller bearing.

1 Seal

Equipped with water-injected single-acting mechanical seal, Chesterton 891, and a seal water flow meter with gauge and an electrical alarm. Seal requires 1 gpm of water at a pressure of 30 psi above the stock inlet pressure. Seal water must be filtered to have all solids larger than 50 microns removed.

1 Drive

Separate vertical motor mounting plate with threaded rod adjustment is included.

One V-belt drive including belts, sheaves, and OSHA approved guard with inspection door is provided.

Special Tools

One tool set per order is supplied which includes the following items: basket lifting tool, rotor extraction tool, and lifting eye bolts.

Unit is equipped with BNC analyzer hook-up for remote mounted piezoelectric accelerometer for monitoring upper and lower bearing vibration.

Materials of Construction

Non-wetted Parts: Steel or cast iron painted to Standard
Voith Paint Specification

Wetted Parts: 316L stainless steel or equivalent

Reference Documents

Dimension Sheet: MSS 06/06-03

Control Schematic: D04-407008.33

Notes to Buyer

Design and operating values stated herein are based on previous experience and the best available measurements and calculations, and are considered to be quality characteristics but not warranted properties or guarantees.

Buyer to supply motor: 60 hp, 1200 rpm, 404T frame, with 1.15 SF with standard torque characteristics suitable for vertical, shaft-down foot mounting.

Soleplates and anchor bolts are to be supplied by the buyer.

The rotating assembly can be removed from the unit without removing the driven sheave.

Dilution water to be added through the reject dilution connection at a pressure of 15 psi above the stock inlet and at a maximum flow rate of 200 gpm.

Oconto Falls
092-FS07-9376-00

Alternates
Section 4
Page 14

Recommended stock inlet pressure, psi:

Optimum: 30 psi

Case Maximum: 87 psi

Minimum: 25 psi

Buyer to supply cover vent valve.

Buyer to furnish proper controls.

Oconto Falls
092-FS07-9376-00

Alternates
Section 4
Page 15

Section 4.6

Centrisorter[®], Model ST 400 Retrofit

Quantity Required: 1

Design Operating Data (per unit):

Furnish:	SOP
Application:	Fine Screening
Location:	Tertiary
Design Capacity:	10.6 BDSTPD (9.7 BDMTPD)
Design Flow:	343 USGPM (1297 LPM)
Inlet Consistency:	0.60%
Passing Velocity:	3.5 f/s (1.06 m/s)
Reject Rate by Weight:	24%
Reject Rate by Volume:	12%
Motor Rating:	75hp
Motor Speed:	1200 rpm

1 FiberLoop

FiberLoop reject recirculation connection.

1 Rotor

MultiFoil rotor has twenty one (21) staggered energy efficient pulse generating foils.
Operating speed is 630 rpm.

1 Cylinder

Screen cylinder has 0.15mm C-bar SQE slots, chrome plated.

Materials of Construction

Non-wetted Parts:	Steel or cast iron painted to Standard Voith Paint Specification
Wetted Parts:	Fabrications – 316L stainless steel Screen Cylinder – 316 stainless steel

Reference Documents

Dimension Sheet:	ST400-00
Control Schematic:	FD0-914-00540

Oconto Falls
092-FS07-9376-00

Alternates
Section 4
Page 16

Notes to Buyer

Design and operating values stated above are based on previous experience and the best available measurements and calculations, and are considered to be quality characteristics but not warranted properties or guarantees.

After inspection, if further modifications and/or rework is required, or if some existing parts do not need to be replaced, Voith reserves the right to submit a revised proposal to cover any additional rework expense of deduction.

Buyer to supply motor: 75 hp, 1200 rpm, 444T frame, with 1.15 SF with standard torque characteristics suitable for vertical, shaft-down foot mounting.

Dilution water to be added across from rejects connection at a rate up to 150 gpm at a pressure of 15 psi above stock inlet.

Buyer to furnish proper controls.

Oconto Falls
092-FS07-9376-00

Alternates
Section 4
Page 17

Section 4.7

Compact Washer, Model CW 2000

Quantity Required: 1

Operating Data per Unit:

Inlet Mass Flow:	103 BDSTPD
Inlet Consistency:	0.91 or more
Inlet Volume Flow:	1882 GPM
Inlet Ash Content (575° C, Tappi T 413; 1993):	16.6 %
Accept Mass Flow (Accept)	80.5 BDSTPD
Accept Consistency:	10 %
Ash Content in Accept:	4.5 %
Filtrate Volume Flow:	1748 GPM
Filtrate Consistency:	0.21 %
Headbox Width:	1650 mm
Wire Width:	1910 mm
Wire Speed:	550 m/min
Motor Speed @ 60/50 Hz:	980/1180 l/min
Motor Rating:	75 hp (55 kW)
Weight of Heaviest Piece:	4080 lb. (1580 kg.)

The exact operating data depends on quality parameters of raw material, e.g. content of fiber, fines and ash (Bauer McNett), inlet consistencies and wire used. The above values are indicative and subject to variations with the raw material mixture supplied to the machine.

1 Basic Machine

- (1) Frame of carbon steel painted, with supports for pillow blocks and integrated stainless steel filtrate tray with stock discharge through opening under the machine.
- (1) Cantilever beam of carbon steel painted to be mounted outside of the machine for wire change.
- (1) Hood with inspection windows. Equipped with lifting points for wire changing.
- (1) Drive roll covered with hard rubber.
- (1) Grooved Breast roll covered with polyurethane. Roll support with, heavy duty bearings mounted in pillow blocks.
- (1) Oscillating, non-contracting stainless steel doctor blade located on the couch roll.

Oconto Falls
092-FS07-9376-00

Alternates
Section 4
Page 18

(1) Oscillating high pressure shower for wire cleaning, 20 bar, 84-105 l/min fresh water (01) fixed low pressure shower, 0.6 bar, 30 l/min fresh water.

(1) Stock distributor with adjustable gap of stainless steel with inserts of polyurethane fixed in a pivotable and laterally adjustable support.

(1) Wire tensioning device with gear screw jacks. Wire is guided by (02) belts attached to the wire.

(1) Extraction screw for thickened stock with gear drive.

(1) Multi layer wire.

(1) Local Control panel with operating and monitoring equipment for: main drive, LP + HP shower, wire tension alarm and wire run error alarm. 24V Electric controls.
Note: frequency converter for main drive is not included!

1 Drive Set (Without Motor)

Machine sheave and motor sheave of cast iron equipped with conical bushes, with V-belts and protection guard.

Note: Frequency converter for main drive is not included and must be supplied by customer.

1 Set Fastening Elements

With foundation blocks, with the corresponding fastening elements.

Oconto Falls
092-FS07-9376-00

Alternates
Section 4
Page 19

Section 4.8

Thune Screw Press, Model SP-70L

Quantity Required: 1

Design Operating Data (per unit):

Furnish:	SOP
Application:	Screw Thickening
Location:	Pre Dispersion
Design Inlet Capacity:	169 BDSTPD (154 BDMTPD)
Design Inlet Flow:	282 GPM (1069 LPM)
Inlet Consistency:	10 %
Outlet Consistency:	30 %
Filtrate Consistency:	0.33 %
pH:	7.5
Temperature:	110° F (43° C)
Inlet Ash Content:	4%
Inlet Freeness:	450 mL CSF
Motor Rating:	200 hp
Motor Speed:	1800 rpm

General

The screw press consists of a 700 mm (27.6 in.) diameter screw surrounded by perforated screen baskets. The screw press unit is generally of modularized cast construction. Screen perforations are step drilled, and screen plate surfaces are electro-deburred.

“L” Model Basket Arrangement

- 1 Inlet Chamber Screen (#1)
- 2 Draining Section Screen Baskets (#2 and 3)
- 1 Compression Section Backing Shell and Screen Plate (#4)
- 1 Internal Screen Plate (#5)

1 Inlet Chamber

A half cylinder screen plate with 1.5 mm step drilled holes and 17.3% open area.

Oconto Falls
092-FS07-9376-00

Alternates
Section 4
Page 20

2 Draining Sections

Draining section screens are rolled for roundness and seam welded, and they are bolt flanged at each end for easy removal. The baskets have 1.5 mm step drilled holes with an overall open area of 17.3%.

1 Compression Section

This high compression section consists of a heavy backing shell and a screen plate. Both the backing shell and the interior screen plate are split longitudinally to simplify inspection of the screw. The backing shell is flanged. The screen plate has 1.5 mm conical drilled holes and the backing shell has 10 mm holes.

1 Internal Screen

The internal screen is located on the screen shaft, perforations are 1.2 mm and the open area is 22.7%.

1 Discharge Chamber

The discharge chamber forms the supporting structure for the SKF radial and thrust bearings, and includes the counter-pressure system.

1 Counter-Pressure System

This is a ring around the screw shaft of pneumatically actuated metal flappers. The flappers apply a counter-pressure to the discharging thick stock so that a stock plug is maintained in the pressing section. The counter-pressure system ensures a constant outlet consistency.

Air requirements: 1.5 lpm at 4 Bar (58 psig) maximum. Includes air line adaptor North American standards.

1 HiCap™ Press Screw

The geometry of the HiCap™ screw has been optimized to provide optimum transport efficiency and drainage. The press screw is fabricated. The screw shaft in the draining section has a single flight. The final flights of the screw are equipped with replaceable WearLess segments.

1 Inlet Bearing

The press screw is supported by a spherical roller bearing at the inlet end. The inlet end bearing is protected from stock seepage by a separate stuffing box housing with lip seals that release towards the inlet chamber. Continuous seal water flow requirement at the inlet end is 6 – 10 lpm (1.3 – 2.5 USGPM) at 138 kpa (20 psi) above feed pressure. Includes seal water line adaptor for North American standards.

Oconto Falls
092-FS07-9376-00

Alternates
Section 4
Page 21

1 Outlet Bearing

The press screw is supported by heavy SKF thrust and radial roller bearings at the outlet end.

1 Local/Remote Control Panel

The press is supplied with a control panel for controlling the counter-pressure system. The control panel can be mounted locally or at some distance from the screw press.

1 Cover

A fabricated cover encases the screen plates. Inspection doors are provided at each cylinder screen plate. The doors are fastened with a wing nut arrangement.

1 Collecting Tray

A collecting tray covers the complete screen drainage area. The collecting tray has a centrally located filtrate outlet, including a North American standard flange.

1 Base Frame

The screw press is supported by a heavy beam profile construction. Only leveling and bolt down installation are required.

1 Mechanical Drive

The mechanical drive includes Metso-Santasalo parallel shaft gear reducer with safeset coupling for screw press side and flexible coupling for motor side, both with guards.

Materials of Construction

Non-Wetted Parts: Painted mild steel
Wetted Parts: 316L stainless steel

Reference Documents

Installation Drawing: D-13091D
Control Schematic: A-016074D

Notes to Customer

Design and operating values stated herein are based on previous experience and the best available measurements and calculations, and are considered to be quality characteristics but not warranted properties or guarantees.

Buyer to furnish one (1) 200 hp, 1800 rpm TEFC, Nema standard, induction motor with standard torque characteristics.

Also excluded from this equipment are soleplates, platforms, instrumentation, variable frequency drive, motor starter and electrical wiring.

Oconto Falls
092-FS07-9376-00

Alternates
Section 4
Page 22

Section 4.9

Eco Flotation Machine, Model ECC

Quantity Required: 1

Design Operating Data (Per Unit):

Furnish:	SOP
Application:	Secondary Flotation
Design Accept Capacity:	13 BDSTPD (11.8 BDMTPD)
Design Accept Flow:	281 USGPM (1063 LPM)
Inlet Consistency:	0.97 %
Inlet Ash:	12.37 %
Secondary Cell Empty Weight (per cell):	2866 lb. (1300kg.)
Secondary Cell Operating Weight (per cell):	11,023 lb. (5000 kg.)

2 Secondary Cell(s), Model ECC 1/38

Each cell is enclosed and elliptical in design.

Each cell includes one (1) atmospheric air injector. Each cell includes one (1) externally adjustable overflow reject weir, one (1) hinged manway for visual inspection of the rejects trough and one (1) aspiration orifice inspection opening. Each cell includes shower water header piping with one (1) .5" hand operated ball valve for the supplied rejects trough shower, one (1) aspiration orifice cleaning shower and one (1) weir cleaning shower with one (1) 2" Dezurik butterfly valve with pneumatic actuator and solenoid. Each cell is supplied with two (2) sets of replaceable aspiration orifices for air adjustment. Each cell requires 37 gpm of shower water at 45 psi with a maximum consistency of .1%.

6 Soleplates

Soleplates supplied for installation of the primary and secondary flotation cells.

Rubber Expansion Joints

For thermal expansion of the flotation cells.

1 Interstage Piping Package

If multiple secondary cells are provided, interstage piping in 11 G.A., 316L stainless steel, starting with the suction piping from the second secondary cell feed pump and ending with the last secondary cell feed flange is provided.

Oconto Falls
092-FS07-9376-00

Alternates
Section 4
Page 23

Piping for the secondary cell system consisting of the first secondary cell feed piping, the secondary cell system accepts piping, the secondary cell system recirculation piping and rejects piping are not included in scope.

Materials Of Construction

Non-wetted parts:	304L SS fabrications
Wetted parts:	316L SS fabrication
Injector Inserts:	Polypropylene
Manways:	Polypropylene
Soleplates:	Mild Steel

Reference Documents

Dimension Sheet: ECC1/38_8/44-03

Notes To Buyer

Design and operating values stated herein are based on previous experience and the best available measurements and calculations, and are considered to be quality characteristics but not warranted properties or guarantees.

Buyer to supply shower water for the flotation cells at 45 psi
(.1% maximum consistency).

Buyer to furnish concrete bases for flotation cell support.

Buyer to furnish controls.

Secondary cell(s) can be supplied detached from primary cells upon request for an additional cost.

Buyer to furnish adequate piping supports.

Stairways and walkways can be provided for an additional cost.

Buyer is responsible for field welding and assembly.

Buyer to provide piping for first secondary cell feed piping, recirculation piping and rejects piping.

Oconto Falls
092-FS07-9376-00

Alternates
Section 4
Page 24

Section 4.9.1

Pump, Model SL364-GIII-15/20

Quantity Required: 1

Design Operating Data (per unit):

Application:	Secondary Cell Feed Pump
Flotation Cell Size:	1/38
Pump Position(s):	S1
Design Flow Rate:	713 gpm (2,700 lpm)
Design Pressure:	33 psi (2.3 Bar)
Motor Rating:	30 hp
Motor Speed:	1200 rpm
Empty Weight:	772 lb. (350 kg.)
Estimated Operating Weight:	849 lb. (385 kg.)

1 Housing

Pump housing consisting of inlet and outlet with replaceable casing nose and wear liners.

Inlet and outlet flange connections with ANSI type (150 lb.) adapters.

1 Impeller

Consisting of four vane, radial design, 364 mm diameter impeller.

Impeller operating speed is 1180 rpm.

1 Rotating Assembly

Shaft with protective sleeve of stainless steel, bearing housing, angular ball bearings and cylindrical roller bearing. Bearings are grease lubricated.

1 Seal

Equipped with packed stuffing box seal. Seal requires 0.8 gpm of water at a constant pressure of 47 psi. Seal water must be filtered to have all solids larger than 50 microns removed.

Oconto Falls
092-FS07-9376-00

Alternates
Section 4
Page 25

1 Soleplate

Soleplate for pump. Soleplate for motor and anchor bolts are to be supplied by Buyer.

1 Drive

One drive including Flender Eupex H160 coupling and OSHA approved guard is provided.

Materials of Construction

Non-Wetted Parts:	Steel or cast iron painted to Standard Voith Paint Specification 01.
Wetted Parts:	Impeller – Austenitic CrNiMo 2 Steel Wear Liners – Austenitic CrNiMo 2 Steel Shaft Sleeve – Austenitic CrNiMo 2 Steel Housing – Cast iron

Reference Documents

Dimension Sheet: SL-00

Notes to Buyer

Design and operating values stated herein are based on previous experience and the best available measurements and calculations, and are considered to be quality characteristics but not warranted properties or guarantees.

Buyer to supply motor: 30 hp, 1200 rpm, with 1.15 SF with standard torque characteristics suitable for foot mounting.

Buyer to mount and align pump, motor and coupling.

Buyer to furnish proper controls.

Buyer to furnish anchor bolts.

Buyer is responsible for the assembly and installation of the unit per the instructions contained within the operating manual.

Buyer is responsible for properly interlocking equipment per the instructions contained within the operating manual.

Oconto Falls
092-FS07-9376-00

Alternates
Section 4
Page 26

Section 4.9.2

Pump, Model SL280-GIII-12.5/15

Quantity Required: 1

Design Operating Data (per unit):

Application:	Secondary Cell Feed Pump
Flotation Cell Size:	1/38
Pump Position(s):	S2
Design Flow Rate:	713 gpm (2,700 lpm)
Design Pressure:	13 psi (0.9 Bar)
Motor Rating:	10 hp
Motor Speed:	1200 rpm
Empty Weight:	584 lb. (265 kg.)
Estimated Operating Weight:	644 lb. (292 kg.)

1 Housing

Pump housing consisting of inlet and outlet with replaceable casing nose and wear liners.

Inlet and outlet flange connections with ANSI type (150 lb.) adapters.

1 Impeller

Consisting of four vane, radial design, 280 mm diameter impeller.

Impeller operating speed is 1180 rpm.

1 Rotating Assembly

Shaft with protective sleeve of stainless steel, bearing housing, angular ball bearings and cylindrical roller bearing. Bearings are grease lubricated.

1 Seal

Equipped with packed stuffing box seal. Seal requires 0.8 gpm of water at a constant pressure of 47 psi. Seal water must be filtered to have all solids larger than 50 microns removed.

Oconto Falls
092-FS07-9376-00

Alternates
Section 4
Page 27

1 Soleplate

Soleplate for pump. Soleplate for motor and anchor bolts are to be supplied by Buyer.

1 Drive

One drive including Flender Eupex H140 coupling and OSHA approved guard is provided.

Materials of Construction

Non-Wetted Parts:	Steel or cast iron painted to Standard Voith Paint Specification 01.
Wetted Parts:	Impeller – Austenitic CrNiMo 2 Steel Wear Liners – Austenitic CrNiMo 2 Steel Shaft Sleeve – Austenitic CrNiMo 2 Steel Housing – Cast iron

Reference Documents

Dimension Sheet: SL-00

Notes to Buyer

Design and operating values stated herein are based on previous experience and the best available measurements and calculations, and are considered to be quality characteristics but not warranted properties or guarantees.

Buyer to supply motor: 10 hp, 1200 rpm, with 1.15 SF with standard torque characteristics suitable for foot mounting.

Buyer to mount and align pump, motor and coupling.

Buyer to furnish proper controls.

Buyer to furnish anchor bolts.

Buyer is responsible for the assembly and installation of the unit per the instructions contained within the operating manual.

Buyer is responsible for properly interlocking equipment per the instructions contained within the operating manual.

Oconto Falls
092-FS07-9376-00

Alternates
Section 4
Page 28

Section 4.9.3

Deaeration Cyclone, Model EZM600B-11.60

Quantity Required: 1

Design Operating Data (per unit):

Furnish:	SOP
Application:	Primary Cell Rejects
Design Flow Range:	132 – 1,057 USGPM (500 – 4,000 LPM)
Motor Rating:	15 hp
Motor Speed:	1200 rpm
Empty Weight:	1,000 lb. (454 kg.)
Estimated Operating Weight:	1,250 lb. (567 kg.)

1 Housing

Housing consisting of cyclone head with inlet flange and separating cone with discharge opening with baffle plate.

Mechanical foam breaker assembly with reject flange and vent flange.

Inlet, reject and vent flange connections are ANSI type (150 lb.).

1 Rotor

Shaft mounted rotor.

Deaeration rotor operating speed is 1170 rpm.

1 Drive

Siemens direct drive motor with dynamic seals.

Motor voltage is 460 volts.

Materials of Construction

Non-Wetted Parts:	Steel or cast iron painted to Standard Voith Paint Specification.
Wetted Parts:	316L stainless steel

Reference Documents

Dimension Sheet:	EZM600B_11-03
Brochure:	Deaeration Cyclone, EZM

Oconto Falls
092-FS07-9376-00

Alternates
Section 4
Page 29

Notes to Buyer

Design and operating values stated herein are based on previous experience and the best available measurements and calculations, and are considered to be quality characteristics but not warranted properties or guarantees.

Buyer to mount and align deaeration cyclone and shower water unit to tank.

Buyer to furnish stainless steel tank, per Voith Paper specifications with support for deaeration cyclone.

Buyer to furnish motor starter.

Buyer to furnish agitator for tank.

Buyer is responsible for the assembly and installation of the unit per the instructions contained within the operating manual.

Buyer is responsible for properly interlocking equipment per the instructions contained within the operating manual.

Oconto Falls
092-FS07-9376-00

Alternates
Section 4
Page 30

Section 4.10

KS 60 Cleaner System with EcoMizer

Design Operating Data:

Furnish:	SOP
Location:	Fine Forward Cleaners
Number of Stages:	1
Inlet Flow per Cleaner:	35 USGPM (132 LPM)
Pressure Drop at Inlet Flow:	30 psi (2.1 Bar)
System Design Capacity:	167BDSTPD (152 BDMTPD)
System Design Flow:	3645 USGPM (13,797 LPM)

Primary Stage:

Inlet Consistency:	0.85 %
Reject Rate, By Weight:	15 %
*Reject Rate, By Volume:	14.61 %
*Thickening Factor:	1.03

(*Includes Elutriation)

1 Cleaner System

Cleaner system has the following configuration:

Primary Stage to have 2 modules of 70 cleaners with a total of 122 active cleaners installed and 18 blanks.

Modules

Each module is complete with inlet, accepts and rejects pipes having Van Stone 150# drilled flange pipe connections.

Cleaners

Each cleaner contains one (1) headpiece with accepted stock outlet, one (1) conical separating tube with stock inlet, and one (1) rejects nozzle.

Cleaner diameter is 60 mm.

Maximum operating pressure should not exceed 60 psi (4 Bar) at 160° F (70° C).
Minimum accept pressure should be 10 psi (0.7 Bar).

Oconto Falls
092-FS07-9376-00

Alternates
Section 4
Page 31

EcoMizer Section

Rejects outlet is equipped with internal elutriation water added axially from bottom.

Rejects are removed radially to a pressurized reject header.

Materials of Construction

HEADERS: Wetted parts are constructed of 316L module support structure supplied is constructed of 304 SS.

CLEANERS: The cleaners are constructed of Polyamide, highly resistant to wear and temperature.

Notes to Buyer

Design and operating values stated herein are based on previous experience and the best available measurements and calculations, and are considered to be quality characteristics but not warranted properties or guarantees.

Buyer to furnish inlet accepts and rejects pressure sensing connections and gauges.

Buyer to furnish controls.

If the stock pH is outside the 5-10 range, contact Voith.

Water Requirements

Maximum Elutriation Pressure:	60 psi (4 Bar)
Minimum Elutriation Pressure:	20 psi (1.4 Bar) greater than accept pressure
Recommended Elutriation:	2 – <u>4</u> USGPM (10 – <u>15</u> LPM)* per cleaner

*Underlined value is basis for pump sizing

Oconto Falls
092-FS07-9376-00

Alternates
Section 4
Page 32

Section 4.11

Conus Trenner 150

Process Specification

Application of 1 x Conus Trenner 150	Fiber Recovery (150 tpd option)
Description of Inlet	DSM Screen Filtrate
Feed Flow Rate	2935 gpm
Feed Consistency	1000 ppm

Performance Description

The values stated below are based on experience. The Conus Trenner has to be engineered, installed, and operated according to the supplier's specification.

Fine fraction*

Throughput	Approx. 2050 - 2300 gpm
Consistency	600 ppm - 1000 ppm

Coarse fraction*

Throughput	approx. 635 - 885 gpm
Consistency	1800 ppm - 2200 ppm

*The quality and quantity of the fine and coarse fraction depends on the mesh size of the wire and the distribution of the particle size in the inlet. The mesh size of the wire determines the throughput of fine and coarse fraction. For this application, a 150 μ m mesh will be applied. The fine fraction will be almost free of particles larger than the diagonal of the applied mesh. The coarse fraction will contain the majority of the particles larger than the diagonal of the applied mesh. More specific values can be given after pilot trials. Solids content to be measured with WHATMAN filter No. 4 or 41 or black ribbon filter paper. (Tappi T656/4.1 or DIN 54359).

Oconto Falls
092-FS07-9376-00

Alternates
Section 4
Page 33

Technical data of one (1) Conus Trenner

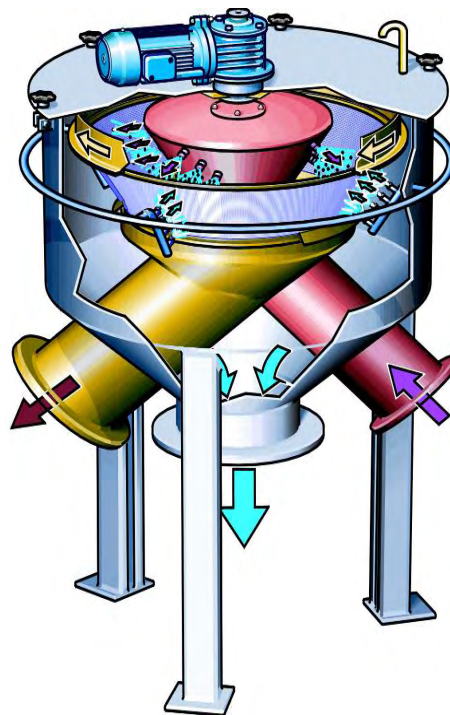
Dimensions and Drives of the Conus Trenner

Max. diameter	81.5 in
Max. height	14.1 ft
Installed power	0.75 hp
Electric connection	460 V / 60 Hz \pm 10 %

Technical Description

Description of Process

The Conus Trenner is a compact, highly efficient, self-cleaning fractionator for fiber recovery, fiber scalping or filtrate fine polishing with low energy consumption. By spraying the suspension against the wire, this is split into coarse and fine fractions according to the wire opening.



Machine structure - Conical geometry

The Conus Trenner is composed of three funnel-shaped cones inside each other. The suspension is sprayed into a rotating wire basket through nozzles installed in the internal feed cone of the Conus Trenner. It enters the Conus Trenner with a pressure of approx. 1 bar (15 PSI). The retained coarse fraction, which is slightly thickened, is collected in the middle cone while the fine fraction passing through the wire is collected in the external cone.

Oconto Falls
092-FS07-9376-00

Alternates
Section 4
Page 34

This last forms the housing of the Conus Trenner. A direct gear drive is used to provide the correct rotating speed of the wire basket. The simple design of the machine equates to high reliability and quick, easy installation.

Special multiple-layer wire

The wire basket consists of a special, multiple-layer stainless steel wire installed on a conical support basket. This sturdy design of the wire prevents vibration damage and damage by abrasive particles in the feed.

Moreover the multiple-layer design enhances a more efficient fractionation reducing the loss of kinetic energy. The wire can be delivered in different openings from 40 μm to 300 μm (50 - 325 mesh).

Spray geometry

The feed nozzles are installed diagonally on the surface of the feed cone for an optimized use of the wire surface and minimised spray overlapping.

Back washing system

Inside the external cone is installed a back washing pipe with nozzles for continuous wire cleaning during operation. The back washing system washes the wire from outside to inside. The effectiveness of the back washing is enhanced by the multiple-layer design which procures a deflection of the spray water throughout all the layers.

Shower Water Consumption	29 gpm @ 45 PSI
Shower water quality	< 100 ppm < 100 μm

Exchangeable wire basket

The wire basket can be easily removed by lifting the cover of the Conus Trenner for easy service operation or wire exchange.

Materials and Surface Treatment

All wetted parts are supplied as standard in AISI 304 (1.4301) or equivalent. Wetted parts are: inlet conical distributor, Fine Fraction cone, Coarse Fraction cone, wire support basket.

The multiple-layer wire is supplied in AISI 316 (1.4401).

The Conus Trenner Options (see price list)

Recommended options

None

Other available options

Upgrade to Material AISI 316 for wetted parts



Voith Paper

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Services

Codeword	Oconto Falls
Proposal No.	092-FS07-9376-00
Section	5

Oconto Falls
092-FS07-9376-00

Services
Section 5
Page 1

Table of Contents

5	Services
5.1	Engineering
5.1.1	Machine Engineering
5.1.2	Basic Process Engineering (optional)
5.1.3	Engineering Review (optional)
5.2	Installation, Training and Startup Assistance

Oconto Falls
092-FS07-9376-00

Services
Section 5
Page 2

Section 5.1

Engineering

5.1.1 Machine Engineering

Machine engineering is included in the scope of supply of the equipment purchased from Voith Paper and comprises the following.

Installation drawings for individual machines and components including:

- Loads (magnitude and location) as well as their dynamic allowances
- Connection type, size and orientation
- Footprint and weight of machines

Operating and Maintenance information including:

- Description of operation
- Typical P&I diagram (for reference)
- Operating data
- Startup procedures
- Shutdown procedures
- Maintenance procedures

Oconto Falls
092-FS07-9376-00

Services
Section 5
Page 3

5.1.2 Basic Process Engineering Option

In addition to the Machine Engineering, Voith can provide the basic process engineering necessary to assure proper performance of the equipment and/or system. If requested by Buyer, a detailed quotation will be provided after project scope is clearly defined.

The Basic Process Engineering package includes:

Process Flow Diagrams PFD(s)

Showing major process equipment, equipment model/size, power requirements for all shown drive motors, liquid flow & mass balance, major piping dimensions and major instrument loops.

Process & Instrumentation Diagrams P & ID(s)

Showing all process equipment, pumps and process related control loops. The symbols used in these drawings are generally based on "Instrument Society of America" (ISA) and "American National Standards Institute" (ANSI) standard ANSI/ ISA S5.1

Mass & Liquid Flow Balance for Stock and Water Systems

Showing, in a spreadsheet form, the liquid flow rates (gpm, lpm etc.) through all primary and secondary pipes. Also the consistency and the mass flow rate (stpd, mtpd, etc.) are shown to determine the system input, to achieve a certain system output.

Lists and/ or Data Sheets including:

- Equipment List
- Pump List
- Motor List
- Valve list
- Instrument Index
- Tank/ Chest List
- Water Consumption Data
- Steam Consumption Data
- Machine and Unit Design Data
- Additives Data (optional)
- Fluid Specification

Oconto Falls
092-FS07-9376-00

Services
Section 5
Page 4

General Arrangement Plans

At a scale of 3/32:1'-0" on the arrangement of fiber system machinery and plant sections within the specified engineering limits.

Process Description

To familiarize Buyer's personnel with the intended process, operation sequence, automation, and operation of the plant for the specified scope of engineering.

Oconto Falls
092-FS07-9376-00

Services
Section 5
Page 5

5.1.3 Engineering Review Option

Review of GA's, PFD's, P&ID's and logic diagrams prepared by others

As an alternative to Section 5.1.2 if plant engineering is carried out by the Buyer and/or its designated engineer, Voith Paper for a nominal fee will review these drawings and make recommendations.

If Buyer requests this service, a detailed specification of the work will be defined for the project and a firm price given.

Note:

Voith Paper shall not be responsible for, and shall incur no liability with respect to, the accuracy or completeness of any engineering information, drawings, designs or other data provided by or obtained from Buyer or third parties, regardless of whether such drawings and information are reviewed by Voith Paper. Voith Paper may be asked to offer suggestions based on its experience, but the decision to implement any changes and responsibility for the final accuracy and correctness of the work remains with the Buyer and/or its subcontractor; and Voith Paper shall not be liable for any losses or liabilities resulting therefrom.

Oconto Falls
092-FS07-9376-00

Services
Section 5
Page 6

Section 5.2

Installation, Training and Startup Assistance

Most Voith Paper stock preparation equipment is delivered fully assembled. Some assistance for equipment erection, checkout, startup, and operator training is beneficial. Therefore, the services of an experienced Voith Paper Field Service Engineer is recommended with our equipment and is available at standard rates in accordance with our Terms and Conditions for Field Service which are incorporated herein.



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Supply Standards and Limits

Codeword	Oconto Falls
Proposal No.	092-FS07-9376-00
Section	6

Oconto Falls
092-FS07-9376-00

Supply Standards and Limits

Section 6
Page 1

Table of Contents

- 6 Supply Standards and Limits**
- 6.1 Standards for Documentation
- 6.2 Standards for Painting
- 6.3 Delivery Limits

Oconto Falls
092-FS07-9376-00

Supply Standards and Limits

Section 6
Page 2

Section 6.1

Standards for Documentation

Format and Supply

All documentation will be in the English language and in the hard copy format. Additional languages will be available at an extra charge.

Standard supply:

- Two copies of the drawings
- Three copies of the bill of material and operation manuals

Optional:

- One set of CD-ROM's with final documentation

Drawings and manuals can be supplied in an electronic data format. Only documentation generated by Voith Paper can be submitted electronically.

Time Schedule

Approval drawings will be submitted within three (3) to four (4) weeks after receipt of order. Certified drawings will be submitted three (3) weeks after return receipt of approved drawings.

Standards

The following standards are used to prepare the engineering documents:

- ANSI - American National Standards Institute
- ASTM - American Society for Testing and Materials
- Buyer's standards and norms as accepted by Voith Paper and attached with this document in annex.
- DIN - German Industrial Standard
- ISA - Instrument Society of America
- ISO - International Organization for Standardization
- Scrap Specifications – Guidelines for Paper Stock
- TAPPI - Technical Association of the Pulp and Paper Industry
- Voith Paper Engineering Standards

Oconto Falls
092-FS07-9376-00

Supply Standards and Limits
Section 6
Page 3

Section 6.2

Standards for Painting Stock Preparation Equipment

Field of Application

This specification applies to all iron castings and carbon steel paper machine parts. Parts built from stainless steel, aluminum, or other corrosion-resistant material will not be painted.

Preparation of Fabrications and Castings

Weld spatter will be removed from all fabrications. Parts to be painted will be blasted to the extent of an SSPC-SP10 (near white) blast. Blasted surfaces will not come into contact with oil, grease or water, including oil left from fingerprints. Immediately after blasting all parts will receive a first prime coat to prevent grease and cutting oils from penetrating the surface.

Paint System

The Paint System consists of primer, intermediate, and finish coats.

Primer

Paint Type	Urethane zinc rich primer
Thickness	Dry film 2.0–3.0 mils
Application	Spraying or brushing

Intermediate Coat

All parts will be cleaned of dust, oil, or cutting fluid deposits prior to painting.

Paint Type	Polyamine epoxy
Thickness	Dry film 3.5–4.5 mils
Application	Spraying or brushing

Oconto Falls
092-FS07-9376-00

Supply Standards and Limits
Section 6
Page 4

Finish Coat

Paint Type High-build acrylic polyurethane enamel

Thickness Dry film 1.5–2.5 mils

Application Spraying or brushing

Coating of Machined Surfaces

Flat mounting surfaces on frames, crossties, etc. will receive one coat of primer.

Paint Type Urethane zinc rich primer

Thickness Dry film 1.5–2.0 mils

Application Spraying or brushing

Note

This specification applies to equipment manufactured in our Appleton, Wisconsin facilities. However, Voith Paper is a global corporation with manufacturing facilities in many countries worldwide; and we reserve the right to outsource manufacturing to other facilities at time of order. Any changes to the paint specification resulting from such outsourcing would be subject to approval by Buyer.

Oconto Falls
092-FS07-9376-00

Supply Standards and Limits
Section 6
Page 5

Section 6.3

Delivery Limits

All items comprising our scope of supply are listed in the aforementioned specification. All additional equipment and services required for operation that are not specified are not included in our scope of supply.

These exclusions are typically:

Equipment and auxiliary materials

- Insulation material and insulation work
- Sound insulation
- Cranes, lifting devices
- Lubricants including the first oil filling for gears, switchgears and machines
- Electrical equipment
- Control equipment and instruments
- Piping and chests
- Platforms, chutes and steel constructions
- Steel foundations, soleplates and anchor bolts

Services

- Basic and detail process engineering
- Basic and detail control engineering
- Static and dynamic calculations
- Assembly and field welding
- Erection and erection supervision
- Checkout and training
- Startup and startup supervision

Services provided by the Buyer

- Concrete foundations
- Grouting



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Consumption Data

Codeword	Oconto Falls
Proposal No.	092-FS07-9376-00
Section	7

Oconto Falls
092-FS07-9376-00

Consumption Data
Section 7
Page 1

Table of Contents

7 Consumption Data

- 7.1 HP and RPM Table – 210 TPD System Upgrade
- 7.2 HP and RPM Table – 150 TPD System Upgrade

Oconto Falls
092-FS07-9376-00

Consumption Data
Section 7
Page 2

Section 7.1

Consumption Data

210 TPD System Upgrade

Item	Qty.	Description	HP (Per Unit)	RPM (Per Unit)
3.1	1	Blade Rotor 316L HD.S 32	---	---
3.2	2	High Density Cleaner, Model HDC 12-850	---	---
3.3	1	MultiSorter, Model MSM 05/05-LR	75	1800
3.4	1	Celleco 350 to EcoMizer Retrofit	---	---
3.5	1	MultiScreen, Model MSS 12/12	200	900
3.6	1	MultiScreen, Model MSS 06/06	60	1200
3.7	1	Centrisorter, Model ST 400 Retrofit	75	1200
3.8	1	Compact Washer, Model CW2500	100	1200
3.9	1	Thune Screw Press, Model SP70L SH	200	1200
3.10	1	Equalizing Screw Conveyor, Model SEG250S-500.4500	20	1800
3.11	1	High Temperature Disperger, Model HTD250ED	1250	1200
3.12	1	EcoCell Flotation System		
3.12.1	1	Pump, Model SL 380-GIV-20/25	60	1200
3.12.2	1	Pump, Model HAL 315-GV-30/30-85	25	900
3.12.3	1	Deaeration Cyclone, Model EZM600B-11.60	10	1800
3.13	1	KS 60 Cleaner System with EcoMizer – 2 Stage	---	---
3.14	1	Conus Trenner, CT 220	1.5	1800

Oconto Falls
092-FS07-9376-00

Consumption Data
Section 7
Page 3

Section 7.2

Consumption Data

150 TPD System Upgrade

Item	Qty.	Description	HP (Per Unit)	RPM (Per Unit)
4.1	1	High Density Cleaner, Model HDC 12-1200	---	---
4.2	1	MultiSorter, Model MSM 05/05-LR	75	1800
4.3	1	Celleco 350 to EcoMizer Retrofit	---	---
4.4	1	MultiScreen, Model MSS 10/10	125	900
4.5	1	MultiScreen, Model MSS 06/06	60	1200
4.6	1	Centrisorter, Model ST 400 Retrofit		
4.7	1	Compact Washer, Model CW2000	75	1200
4.8	1	Thune Screw Press, Model SP70L SH	50	1200
4.9	1	EcoCell Flotation System		
4.9.1	1	Pump, Model SL 364-GIII-15/20	30	1200
4.9.2	1	Pump, Model SL280-GIII-12.5/15	10	1200
4.9.3	1	Deaeration Cyclone, Model EZM600B-11.60	10	1800
4.10	1	KS 60 Cleaner System with EcoMizer – 1 Stage	---	---
4.11	1	Conus Trenner, CT 150	0.75	1800



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Exhibits

Codeword	Oconto Falls
Proposal No.	092-FS07-9376-00
Section	8

Oconto Falls
092-FS07-9376-00

Exhibits
Section 8
Page 1

Table of Contents

8	Exhibits
8.1	General Terms and Conditions
8.2	Field Service Rates
8.3	Drawings and control schematics
8.4	Brochures



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General Terms and Conditions

ACCEPTANCE AND GOVERNING PROVISIONS: This document constitutes an offer by VOITH PAPER ("VOITH PAPER") to sell the Products described herein subject to and in accordance with these terms and conditions of sale, except for offers marked "Budget", which are non-binding and for discussion purposes only. This offer is expressly limited to acceptance of the terms and conditions contained herein and on any attachment hereto within 30 days from the date hereof. Purchase orders submitted by Buyer for Products quoted or described herein shall be subject to and will be deemed to constitute acceptance of these terms and conditions. All purchase orders shall be subject to credit investigation and approval of Buyer at VOITH PAPER's home office. No modification, change, or waiver of any of these terms and conditions, nor any additional or different terms and conditions, will be binding upon VOITH PAPER unless specifically agreed to in writing by VOITH PAPER's authorized officer; failure of VOITH PAPER to object to the provisions contained in any purchase order or other communication from Buyer shall not be construed as a waiver of these terms and conditions nor an acceptance of any such provisions. The contract created by Buyer's acceptance of these terms and conditions shall constitute the entire agreement between VOITH PAPER and Buyer, superseding any and all prior or contemporaneous agreements, negotiations or discussions between the parties hereto, and shall be governed by and construed in accordance with the internal laws of the State of Wisconsin.

No order may be cancelled or altered by Buyer except upon terms and conditions acceptable to Seller, as evidenced by Seller's written consent. In the event of such a cancellation by Buyer that has been approved by Seller, Buyer shall pay to Seller (i) the agreed unit prices for completed Products (or components thereof), whether or not delivered; or (ii) for non-completed Products (or components thereof), all costs incurred by Seller prior to cancellation directly connected with those Products or components, plus all other costs incurred by Seller associated with the cancellation of the order, including, without limitation, cancellation charges under subcontracts, charges for packing, removal to storage, and/or restocking, plus Seller's overhead costs allocable to such order and a reasonable profit.

TAXES: Any manufacturer's tax, occupation tax, use tax, sales tax, excise tax, duty, custom, inspection or testing fee or any other tax, fee or charge of any nature whatsoever imposed by any governmental authority (whether domestic or foreign, or federal, state or local), on or measured by the transaction between VOITH PAPER and the Buyer (other than income taxes imposed on VOITH PAPER) will be added to the purchase price and invoiced separately, and shall be paid by the Buyer in addition to the prices quoted. In the event VOITH PAPER is required to pay any such tax, fee, or charge, Buyer shall reimburse VOITH PAPER therefor promptly upon receiving VOITH PAPER's invoice.

PAYMENTS: Unless other terms are specified herein, all payments shall be in United States Dollars, and prorated payments shall become due as milestones are achieved. In the event a milestone(s) is delayed by Buyer, the original milestone date shall be used for payment purposes. If manufacture is delayed by Buyer, a payment shall be made based on purchase price and percentage of completion, balance payable in accordance with the terms as stated.

If payments are not made in conformance with the terms stated herein, the contract price shall, without prejudice to VOITH PAPER's right to immediate payment, be subject to interest at the rate of 1% per month on the unpaid balance, but not to exceed the maximum amount permitted by law.

If at any time in VOITH PAPER's judgment Buyer may be or become unable or unwilling to meet the payment terms specified or if VOITH PAPER shall reasonably deem itself insecure, VOITH PAPER may require satisfactory assurances or full or partial payment as a condition of commencing or continuing manufacture or in advance of shipment, or if shipment has been made, recover the Products from the carrier. If Buyer defaults in any payment when due, or in the event any voluntary or involuntary bankruptcy or insolvency proceedings involving Buyer are initiated by or against Buyer, then the whole contract price shall immediately become due and payable upon demand, or VOITH PAPER, at its option without prejudice to its other lawful remedies, may defer delivery or cancel Buyer's order. If manufacture or delivery is deferred or delayed for any reason beyond VOITH PAPER's control, the Products

may be stored at Buyer's risk and expense, and VOITH PAPER may submit a new estimate of costs for completion based upon prevailing conditions.

WARRANTY: VOITH PAPER warrants the Products manufactured and sold by it to be free from defects in materials and workmanship and to conform to VOITH PAPER's description herein for a period of one year from date of initial operation by Buyer or eighteen (18) months from date of shipment or offer to ship, whichever period shall expire first. If within such warranty period any such Products shall be proved to VOITH PAPER's satisfaction to be defective or nonconforming, such Products shall be repaired or replaced, or the purchase price adjusted, at VOITH PAPER's sole discretion. This warranty shall be conditioned upon VOITH PAPER's receiving written notice of any defect within ten (10) days after it was discovered or by reasonable care should have been discovered.

This warranty does not (i) cover shipping expenses or costs of removing defective Products or reinstalling repaired or replaced Products, (ii) apply and shall be void with respect to Products not operated in accordance with operating instructions or requirements, to Products repaired or altered by others than VOITH PAPER, or which were subjected to negligence, misuse, misapplication, accident, damages by circumstances beyond VOITH PAPER's control, to installation or start-up not supervised by Voith Paper or performed by Buyer or a third party without Voith Paper's express written consent, to improper operation, maintenance or storage, or to other than normal use or service, and (iii) apply to Products or components thereof not manufactured by VOITH PAPER. With respect to Products or components not manufactured by VOITH PAPER, VOITH PAPER's warranty obligations shall in all respects conform and be limited to the warranty actually extended to VOITH PAPER by its suppliers, but in no event shall VOITH PAPER's obligations be greater than those provided under this warranty.

THE FOREGOING WARRANTIES ARE IN LIEU OF ALL OTHER EXPRESS AND IMPLIED WARRANTIES, INCLUDING, WITHOUT LIMITATION, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. While VOITH PAPER will cooperate (at Buyer's expense) with Buyer in the design of safety devices Buyer deems necessary and specifies in writing, VOITH PAPER does not warrant that the Products comply with Buyer's safety requirements. Buyer acknowledges that VOITH PAPER has no control over application and use of the Products sold by VOITH PAPER and that Buyer shall be solely responsible for assuming compliance of the Products with OSHA and other federal, state and local safety laws and requirements. Any description of the Products, whether in writing or made orally by VOITH PAPER or by VOITH PAPER's agents, specifications, samples, models, bulletins, drawings, diagrams, engineering sheets or similar materials used in connection with Buyer's order are for the sole purpose of identifying the Products and shall not be construed as an express warranty unless expressly designated as such in writing by VOITH PAPER's authorized officer. Any suggestions by VOITH PAPER or VOITH PAPER's agents regarding use, application or suitability of the Products shall not be construed as an express warranty unless confirmed to be such in writing by VOITH PAPER's authorized officer.

PATENTS: VOITH PAPER will, at its own expense, defend or settle any suits that may be instituted against Buyer for alleged infringement by the Products of any United States patent, provided that Buyer shall have made all payments for such Products then due hereunder, shall give VOITH PAPER immediate notice in writing of any such suit and transmit to VOITH PAPER immediately upon receipt all processes and papers served upon Buyer, and shall permit VOITH PAPER through its counsel, either in the name of Buyer or in the name of VOITH PAPER, to defend such suits and give all needed information, assistance and authority to enable VOITH PAPER to do so. In case of a final award of damages in any such suit, VOITH PAPER will pay such award but will not be responsible for any compromise or settlement made without its written consent. In case the Product itself is in such suit held to infringe any valid patent issued by the United States and its use enjoined, or in the event of a settlement or compromise approved by VOITH PAPER which shall preclude future use of the Products sold to Buyer hereunder, VOITH PAPER shall, at its own expense, and at its sole option, either procure the right to continue using such Products, modify the Products to render them noninfringing, replace the Products with noninfringing

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General Terms and Conditions

Products, or refund the purchase price paid by the Buyer for the Products after return of such Products to VOITH PAPER. Notwithstanding the foregoing, VOITH PAPER shall not be responsible for infringements of combination or process patents covering the use of the Products in combination with other goods or equipment not furnished by VOITH PAPER.

The foregoing states the entire liability of VOITH PAPER for patent infringement, and in no event shall VOITH PAPER be liable for consequential damages attributable to an infringement nor for infringement based on the use of the Products for a purpose other than that for which they are sold by VOITH PAPER. As to any Products furnished by VOITH PAPER to Buyer manufactured in accordance with designs proposed or furnished by Buyer or any claim of contributory infringement resulting from the use or resale by Buyer of Products sold hereunder, Buyer shall indemnify VOITH PAPER against any award made against VOITH PAPER for any patent, trademark or copyright infringement.

DELAYS: If VOITH PAPER suffers delay in performance due to any cause beyond its control, such as act of GOD, war, act of government, act or omission of Buyer, fire, flood, strike or labor trouble, sabotage, delay in obtaining from others suitable services, materials, components, equipment or transportation, the time of performance shall be extended for a period of time equal to the period of the delay and its consequences, or VOITH PAPER may, at its option, cancel the order without liability to Buyer. VOITH PAPER will give Buyer notice in writing within a reasonable time after VOITH PAPER becomes aware of any such delay.

DELIVERY: Unless otherwise specified on the face hereof, all sales are FCA VOITH PAPER's plant or other point of shipment designated by VOITH PAPER (according to INCOTERMS 2000). VOITH PAPER shall select method of transportation and route, unless terms are FCA point of shipment without freight allowed and Buyer specifies the method and route. Shipping dates are estimates which are not guaranteed and are based upon prompt receipt from Buyer of all required technical information, including drawing approval, shipping information and commercial documentation. VOITH PAPER reserves the right to make delivery in installments. All installments to be separately invoiced and paid for by Buyer when due per invoice, without regard to subsequent deliveries.

Regardless of shipping terms, delivery of Products to a carrier at VOITH PAPER's plant or other loading point shall constitute delivery to Buyer, and any risk of loss and further cost and responsibility thereafter for claims, delivery, loss or damage, including, if applicable, placement and storage, shall be borne by Buyer. Claims for shortages or other errors in delivery must be made in writing to VOITH PAPER within ten (10) days after receipt of shipment, and failure to give such notice shall constitute unqualified acceptance and a waiver of all such claims by Buyer. Claims for loss or damage to Products in transit must be made to the carrier and not to VOITH PAPER.

SECURITY AGREEMENT AND INSURANCE: To secure payment of the purchase price and performance of all of Buyer's obligations hereunder, Buyer hereby grants to VOITH PAPER a security interest in all Products, and agrees to execute such other agreements and financing statements, and do all acts necessary to perfect and maintain said security interest, as Seller may reasonably request. Until payment in full of the purchase price, Buyer shall maintain insurance covering all Products in such amounts and against such risks as is customary by companies engaged in the same or similar business and similarly

located, naming VOITH PAPER as insured or coinsured, and shall, upon VOITH PAPER's request, furnish evidence of such insurance satisfactory to VOITH PAPER.

SPECIAL SHIPPING DEVICES: The value of each special shipping device (for example, oil barrel, reel, tarpaulin, cradle, crib, etc.) used by VOITH PAPER to contain or protect the Products in shipment will be invoiced to and shall be paid by Buyer as a separately stated addition to the contract price. If VOITH PAPER's proposal, quotation or other contract documents stipulate the return of any such device, it shall be returned by the Buyer in good condition for credit, F.O.B. Buyer's plant, freight collect, within thirty (30) days after receipt by Buyer.

Return of any such devices as to which there is no stipulation but which has been separately invoiced is at the option of Buyer. If returned promptly in usable condition, F.O.B. VOITH PAPER's plant or other destination designated by VOITH PAPER, freight prepaid, VOITH PAPER will grant Buyer a credit in the invoiced amount (except oil barrels, as to which arrangements for return and refund must be made by the Buyer with the refiner).

The foregoing provisions as to special shipping devices shall not apply to any such device shipped outside the continental United States and Canada.

CONSEQUENTIAL DAMAGES: VOITH PAPER's liability with respect to Products proved to its satisfaction to be defective within the stated warranty period shall be limited to repair, replacement or adjustment as provided in the Warranty section hereof, and in no event shall VOITH PAPER's liability exceed the purchase price of the Products involved. VOITH PAPER shall not be subject to any other obligations or liabilities, whether arising out of breach of contract, warranty, tort (including strict liability and negligence) or other theories of law, with respect to Products sold or services rendered by VOITH PAPER, or any undertakings, acts or omissions relating thereto. VOITH PAPER specifically disclaims any liability to property or personal injury damages, penalties, special or punitive damages, damages for loss of profits or revenues, loss of use of the Products or any associated equipment, cost of capital, cost of substitute Products, facilities or services, down-time, shut-down or slow-down costs, or for any other types of economic loss, and for claims of Buyer's customers for any such damages. VOITH PAPER SHALL NOT BE LIABLE FOR AND DISCLAIMS ALL CONSEQUENTIAL, INCIDENTAL AND CONTINGENT DAMAGES WHATSOEVER.

Notwithstanding anything in this agreement to the contrary, VOITH PAPER shall not be responsible for, and shall incur no liability with respect to, any information supplied by the Buyer or any of its subcontractors and any design or engineering drawings, regardless of whether such drawings are reviewed by VOITH PAPER.

DRAWINGS; OTHER DESIGN DATA: All specifications, drawings, designs, data, information, ideas, methods, patterns and/or inventions made, conceived, developed or acquired by VOITH PAPER in connection with procuring and/or executing Buyer's order will vest in and insure to VOITH PAPER's full benefit notwithstanding any charges therefor which may have been or may be imposed by VOITH PAPER and shall not be disclosed to third parties without VOITH PAPER's prior written consent.

INSPECTION: Buyer or its authorized agents shall have the right to visit VOITH PAPER's workshops to inspect progress and construction of the Equipment during normal business hours upon three (3) days written notice.



Voith Paper

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Field Service Rates

Voith Paper Inc. (VPA) Fiber Systems Division field service personnel are available at the following rates during erection, start-up, training, inspection and/or repair of machines, and equipment supplied by VPA. The Purchaser shall furnish at his own expense all necessary labor, supplies, and facilities to erect and to operate the equipment. All travel and other related expenses associated with the trip(s) will be for the Purchaser's account.

		General Engineer	Specialist
Weekdays (Excluding Saturdays)			
First Eight (8) Hours Per Day	USD/Hour	135.00	160.00
Time >8 hours <12 hours	USD/Hour	202.50	240.00
Time over 12 Hours Per Day	USD/Hour	270.00	320.00
Saturdays			
First 12 Hours Per Day	USD/Hour	202.50	240.00
Time over 12 Hours Per Day	USD/Hour	270.00	320.00
Sundays and Holidays		USD/Hour	270.00

â Airfare, travel and living expenses, meals, car rental:	Actual cost plus 15% administration fee
â Small truck mileage rate:	\$0.80 per mile
â Large truck mileage rate:	\$1.40 per mile
â Mileage (company vehicle):	IRS maximum allowable plus 15%
â In-house services and report writing, mobilization, demobilization, mill safety orientation and drug testing:	Calculated at above rate
â Special tooling, consumables and rental equipment:	Actual cost plus 15% administration fee
â Diagnostics equipment rental:	\$500/day for computerized equipment \$100/day for other equipment
â Minimum charge:	Four (4) hours plus travel and living expenses, if any
â Standby time:	Minimum of eight (8) hours per day at stated rates
â Charge for cancellation with less than 72 hours notice:	8 hours/person or actual prep time and material costs, whichever is greater

Holiday Schedule: The following holidays shall be recognized: New Years' Day, Good Friday, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, Friday following Thanksgiving, Christmas Eve*, Christmas Day*, and New Year's Eve. Additionally, the following holidays shall apply in Canada: Victoria Day, St. Jean Baptiste Day (Quebec only), Canada Day and Boxing Day. Other than an extreme emergency, Christmas Day shall be considered a No Work holiday for Voith Paper employees. VPA's representative will not be required to work on Christmas Eve or Christmas Day unless mutually agreed to in advance. Furthermore, it will be the responsibility of the Purchaser to make the necessary arrangements to insure the representative's arrival at the VPA home plant not later than six o'clock (6:00) PM home plant time, December 23. If it is necessary for the representative to return to the job site on December 26, travel from VPA's home plant will not begin before five o'clock (5:00) AM (home plant time) on December 26. If travel or work is agreed to take place during this period, the purchaser shall pay US \$750/day for Christmas Eve and US \$1,000/day for Christmas Day for each service person, over and above the rates or previously negotiated purchased time as noted in the Capital Equipment Contract.

Voith Paper Inc.
Appleton

General Terms and Conditions for Field Service

Travel time and travel expenses to the mill site and return will be for the Purchaser's account. Travel time will be charged at straight time rates and will not exceed \$1200 per day. Travel time will be computed from the time the VPA representative leaves the VPA plant until arrival at the Purchaser's plant.

Delays in commencement or continuance of the field service encountered during the regular work week after the arrival of the VPA representative will be billed at a rate of eight (8) hours per day, straight time, as long as the VPA representative is required to remain at the mill site. The VPA representative will be paid for each hour of standby time at the weekday rate per the rate schedule listed herein. Standby is defined as time, up to eight (8) hours per day, Monday through Sunday, during which the VPA representative, during the course of his assignment, is available for work but is not working due to circumstances beyond VPA's control.

Unless specified otherwise, the VPA representative shall act only in an advisory capacity. The representative shall not be required to superintend personnel supplied by the Purchaser or train them in their respective crafts in connection with the performance of their work.

THE PURCHASER IS RESPONSIBLE FOR PROVIDING A SAFE WORKING ENVIRONMENT FOR THE VPA REPRESENTATIVE WHILE ON THE JOB SITE.

It is the policy of VPA that all field service personnel work a normal eight (8) hour day. It is realized under certain conditions it might be advantageous to work longer than eight (8) hours for short periods of time. However, for the safety and welfare of all concerned, VPA field personnel must not be expected to work over twelve (12) hours per day without a reasonable rest break before the next work period or more than thirteen (13) consecutive days at any one time. Requirements beyond this will necessitate additional manpower and will be billed accordingly.

VPA's obligation is to furnish services and not specific personnel. VPA reserves the right at any time, and from time to time, at its own expense, to recall and substitute any of its personnel.

Terms of Payment are net thirty (30) days from date of receipt of invoice.

All Social Security and withholding taxes, disability insurance payments or the like, for or on account of the representative, will be the responsibility of VPA.

Subject to the Limitation of Liability section below, the parties hereby agree to indemnify and hold each other harmless from and against any and all losses, claims, liabilities, injuries, and expenses (including court costs and reasonable fees and expenses of counsel) asserted by employees and agents of each other and by third parties and arising out of the acts or omissions of each other's officers, employees, representatives, and/or agents in connection with this Agreement, with each party accepting liability subject to, and up to, the extent of their comparative negligence or willful misconduct.

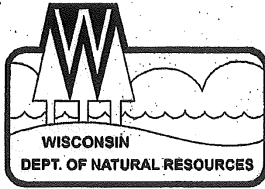
Buyer agrees to give VPA prompt written notice of any loss, claim, liability, injury, or expense covered by the Indemnification section of this Agreement, and in any event within three (3) days after Buyer becomes aware of such loss, claim, liability, injury, or expense. VPA shall be entitled at its expense to control and direct the defense of any such claim in its discretion and Buyer shall cooperate fully with VPA in the defense, including, but not limited to, the providing of all required testimony and documentation at Buyer's expense. Any settlement by Buyer of any such claim without VPA's prior written consent shall render the indemnification provided under the Indemnification section null and void.

VPA shall not be responsible but Buyer shall be responsible for damage to, or destruction of, buildings and personal property, the title to which is in Buyer, resulting solely from perils covered under Buyer's fire and extended coverage insurance policies, and originating from any cause whatsoever, including the negligent acts or omissions of VPA while lawfully on or about the premises of the Buyer.

TAXES AND OTHER CHARGES: Any manufacturer's tax, retailer's occupation tax, use tax, sales tax, excise tax, duty, custom, inspection or testing fee, or any other tax, fee, or charge of any nature whatsoever, imposed by any governmental authority on, or measured by, any transaction between VPA and the Buyer, shall be paid by the Buyer in addition to the prices quoted or invoiced. In the event VPA shall be required to pay any such tax, fee, or charge, the Buyer shall reimburse VPA therefore; however, the Buyer may provide VPA at the time the order is submitted with an exemption certificate or other document acceptable to the authority imposing the same.

LIMITATION OF LIABILITY: Notwithstanding any provision in this Agreement to the contrary, VPA shall not be liable for special, indirect, incidental, or consequential damages such as, but not limited to, loss of profits or revenue, and/or damage or loss of other property or equipment or cost of capital. The remedies of Buyer set forth herein are exclusive, and VPA's liability with respect to any contract or sale or anything done in connection herewith, whether in contract, in tort, under strict product liability, under any warranty, or under any other theory of recovery in law or equity, or otherwise, shall not exceed the cost of services provided hereby.

VPA agrees to maintain adequate Public Liability insurance covering the obligations set forth herein and Workmen's Compensation insurance, as required by law, covering all employees. Upon Buyer's request, all such insurance shall be evidenced by a Certificate of Insurance, executed by the VPA insurance carrier(s) and filed with the Buyer specifically providing that VPA's Public Liability insurance includes contractual coverage covering this Agreement, and further, that said insurance will not be canceled or changed until at least thirty (30) days written notice has been given to Buyer.



State of Wisconsin \ DEPARTMENT OF NATURAL RESOURCES

Jim Doyle, Governor
Scott Hassett, Secretary

101 South Webster Street
P.O. Box 7921
Madison, WI 53707-7921
Telephone (608) 266-2621
FAX (608) 267-3579
TTY Access via relay - 711

February 19, 2007

Stephen Lea
Plant Manager
Oconto Falls Tissue Inc
106 E Central Ave
Oconto Falls, WI 54154

SUBJECT: Oconto Falls Tissue, Proposed Amendment to Plans and Specifications for Wastewater Treatment System Improvements (Plan Approval S-2006-0644, August 10, 2006)

Dear Mr. Lea:

It is my understanding that you desire conceptual agreement with the proposal presented in an engineering report amendment by Tom Vik, McMahon Associates dated February 13, 2007 (and received via email Feb. 15, 2007) to add a Dissolved Air Floatation unit as a polishing unit for the existing final clarifier (which is also proposed to be significantly improved) instead of retrofitting an existing tank into a new final clarifier (per Plan Approval S-2006-0644, dated August 10, 2006), prior to submittal of modified final plans and specifications. This letter will notify you that the design concepts presented in the referenced engineering report amendment are acceptable and that based on information available at this time, a modified conditional plan approval will be issued very shortly after submittal of complete plan modifications.

However, this letter does not in any way imply agreement with delays to date in improving the existing wastewater treatment system using previously approved plans (amended plans or other measures) to meet limits in WPDES permit WI-0000531-07 for discharge to the Oconto River.

Sincerely,

David Hantz, P.E.
Wastewater Engineer
Bureau of Watershed Management

cc: Permit File - Central Office
Bruce Oman - Peshtigo
Karl Roovers - Green Bay
Tom Vik - McMahon

dnr.wi.gov
wisconsin.gov

Quality Natural Resources Management
Through Excellent Customer Service



STATE OF NEW YORK
IN SENATE
January 17, 2021
REPORT OF THE
COMMISSIONER OF THE
DEPARTMENT OF
CORRECTIONS



REPORT OF THE
COMMISSIONER OF THE
DEPARTMENT OF
CORRECTIONS
FOR THE YEAR
ENDING DECEMBER
31, 2020

The Department of Corrections is proud to have served the State of New York for over 150 years. We are committed to providing the highest quality of care and services to our inmates, staff, and the community. We are also committed to being a good neighbor and a responsible corporate citizen. We are proud to be a part of the State of New York and to serve the people of New York.

The Department of Corrections is a large and complex organization. We have a wide range of responsibilities, from providing food and shelter to our inmates, to providing medical and mental health services, to providing education and vocational training. We are also responsible for maintaining the security of our facilities and for ensuring that our inmates are safe and secure.

We are proud to be a part of the State of New York and to serve the people of New York. We are committed to providing the highest quality of care and services to our inmates, staff, and the community. We are also committed to being a good neighbor and a responsible corporate citizen. We are proud to be a part of the State of New York and to serve the people of New York.



January 3, 2007

MEMORANDUM

To: Oconto Falls Tissue, Inc.

From: Tom Vik, P.E., BCCE
McMahon Associates, Inc.

Re: Revisions to the Engineering Report
McM. No. O0046-960323.00

Background

McMahon Associates, Inc. prepared an Engineering Report for Oconto Falls Tissue (OFTI) dated April 28, 2006, which recommended modifications to the wastewater treatment plant to comply with effluent limitations at a production rate of 175 TPD using recycled fiber. Since then, some, but not all of our recommendations were implemented. Also, the plant has continued to struggle meeting effluent limitations, largely due to solids loss from the 60 ft. diameter final clarifier.

On 12/20/06, representatives of OFTI met with McMahon and MCO to discuss options available to meet effluent limits at a production rate of 210 TPD of recycled paper. OFTI asked McMahon to do the following.

1. Evaluate alternatives that will bring the plant into compliance while processing 210 TPD of recycled fiber. This results in a 20% increase in loadings from those established in the April 28, 2006 Engineering Report.
2. Evaluate BOD loadings from different recycle paper furnish.
3. Recommend capital improvements necessary to comfortably maintain compliance with effluent limitations at 210TPD production using recycled fiber within a capital budget between \$500,000 to \$750,000.

This memorandum addresses items 1 and 3 above.



Page 2

MEMORANDUM (Cont.)**Flows & Loadings**

Processing 210 TPD of recycled fiber will increase the design flows and loadings from the 04/28/06 Engineering Report by 20%. This will affect loadings to the mini system and 001 system.

Mini System Recommendations

Summarized below are recommendations for the mini system which were made in the 04/26/06 Engineering Report, modified to accommodate a 20% increase in loading:

1. Engineering Report Recommendation: Air to Aeration Basin #2 should be controlled with a continuous Dissolved Oxygen (D.O.) monitor, new blower with a variable frequency drive (VFD) and a D.O. controller to maintain a minimum D.O. of 1.5 to 2 mg/l in Aeration Basin #2. The new blower would operate as the primary blower with the existing Nash compressor used for backup.
Current Recommendation: Implement this recommendation. A used blower was purchased by OFTI and needs to be installed, with a 100 HP motor, and with a proper shieve size to maximize the blower output.
2. Engineering Report Recommendation: Additional diffusers should be added to Aeration Basin #2. The 72 diffusers currently in the tank were sized for an average air flow rate of 537 cfm, whereas 1,710 scfm is required. The number of diffusers in the tank should, at least, double to 144 total.
Current Recommendation: This work was accomplished in late 2006. No more action is needed.
3. Engineering Report Recommendation: Install a flow meter on the RAS line.
Current Recommendation: Implement this recommendation.
4. Engineering Report Recommendation: Aeration Basins #2 and #3 should be drawn down annually and the diffusers inspected and cleaned. One membrane diffuser from Aeration Basin #2 should be tested every 2-years to determine stretch, elasticity and hole/aperture size in order to estimate the need for replacement with new units.
Current Recommendation: Implement this recommendation.
5. Engineering Report Recommendation: The existing spare rotating assembly and motor for the RAR pumps should be kept in stock in the event of failure.
Current Recommendation: Implement this recommendation.

Page 3

MEMORANDUM (Cont.)

6. Engineering Report Recommendation: Performance in the Mini-Plant system that results in an average monthly effluent BOD consistently greater than 1,300 to 1,400 lbs./day should trigger the need for additional capacity for the Mini-Plant system, more capacity for the 001-Plant system or a reduction in production to reduce loadings.

Current Recommendation: Continue to monitor the performance of the mini system. The increase in loadings by 20% should be treatable in the mini system with the new diffusers and 100 HP VFD driven, DO controlled blower. We also recommend flow control be provided from Aeration Basin #2 to the Krofta to eliminate flow spikes, which will enhance the Krofta performance.

001 System Recommendations

Summarized below are recommendations for the 001 system which were made in the 04/26/06 Engineering Report, modified to accommodate a 20% increase in loadings:

1. Engineering Report Recommendations: Replace the REEF aeration diffusers in Aeration Basin #1 with the fine bubble magnum tube diffusers installed at a constant submergence.
Current Recommendation: This work was accomplished in late 2006.
2. Engineering Report Recommendation: Upgrade the capacity of the aeration blowers to provide an average air rate of 1,730 scfm at 8.1 psig and 2,723 scfm for the maximum day demand at 8.1 psig. This will provide enough oxygen to treat a primary effluent BOD of 3,560 lbs./day average and 5,700 lbs./day maximum day. Verify the air header size from the blower as being a minimum of 10-inches.
Current Recommendation: The blower output must be increased by 20%, thereby needing to meet and average air rate of 2,076 scfm and maximum day demand of 3,268 scfm. This will require a speed increase and 100 HP motor for one existing 75 HP blower, one new 100 HP blower and one 50 HP existing blower as spare. Discharge air piping in the blower room is recommended to be 10 inch. Check valves are recommended for each blower.
3. Engineering Report Recommendation: Install a permanent D.O. monitoring system and automatic D.O. control of the blower speed/output to match oxygen demand with supply.
Current Recommendation: Implement this recommendation.

Page 4

MEMORANDUM (Cont.)

4. Engineering Report Recommendation: Install flow meters on the RAS and WAS lines. Automate the RAS and WAS system.

Current Recommendation: Install flow meters as recommended. Defer automation.

5. Engineering Report Recommendation: Convert the intermediate clarifier into a final clarifier with a rapid sludge removal mechanism. With this option, use the existing final clarifier for storm water flows. This will eliminate peak flows to the final clarifier during storm events, thus minimizing washout potential.

Current Recommendation: Revisit this recommendation. We recommend the following options be evaluated:

1. Original Recommendation
2. Convert the 60 ft. intermediate clarifier into a DAF clarifier.
3. Install a new DAFT clarifier, replacing the 60 ft. final.
4. Install a DAF as a polishing unit after the 60 ft. final clarifier.

6. Engineering Report Recommendation: Reconfigure and re-design the piping to flow by gravity from the aeration basin to the intermediate clarifier (new final clarifier).

Current Recommendation: This was implemented in late 2006 by adding a gravity flow pipe from the 90 ft. aeration basin to the 60 ft. final clarifier.

Revisitation of Clarifier Recommendations

1. Original Recommendation: This option converts the existing 60 ft. intermediate clarifier into a final clarifier. The 60 ft. final was to be used for stormwater flow and backup to the new clarifier.

The cost for this option was estimated in July 2006, and is shown below:

Clarifier Equipment	\$110,000
Scum Pump	5,000
Piping, Valves	25,000
Installation	50,000
Electrical	30,000
TOTAL	\$220,000

Page 5

MEMORANDUM (Cont.)

Advantage of this option is relatively low cost. Disadvantages include:

1. Time to obtain equipment and install is 6 months minimum.
 2. The sludge (MLSS) has shown more of a tendency to float rather than settle. If the sludge floats, there is no backup means of capturing the floating solids, hence effluent violations risk is still there.
 3. The sludge suction return line is quite lengthy at about 150 ft. This is undesirable for a headless perspective.
 4. In order for the existing 60 ft. final to be used as backup to the new final, the flow needs to be pumped again. This is undesirable and has proven to negatively impact sludge settleability.
2. Convert the 60 ft. Intermediate Clarifier into a DAFT Clarifier: This option would include converting the existing intermediate clarifier into both a settling clarifier and DAF. Thus if the sludge tended to float rather than settle, the floatation mode could be employed.

Estimated Cost for this Option is:

Polymer System	\$25,000
Clarifier & DAFT Mechanism	200,000
Float Pumps	15,000
Recycle System	25,000
Piping Valves	50,000
Install	75,000
Electrical	40,000
TOTAL	\$430,000

An advantage of this option is that it will consistently meet effluent limits. Disadvantages include capital costs and high polymer cost.

3. Install a new prefabricated DAFT clarifier to replace the existing final clarifier.
- This option would cost more than the previous option and have the same disadvantages therefore we recommend not considering this option.
4. Install a Polishing DAF: This option would consist of installing a DAF after the existing 60 ft. final clarifier to float any solids remaining in the clarifier effluent and return them to the 90 ft. aeration basin as RAS.

Page 6

MEMORANDUM (Cont.)

Estimated Cost for this Option is as follows:

Polymer System	\$25,000
DAF	210,000
Slab	15,000
Installation	30,000
Float Pumps	15,000
Piping & Valves	30,000
Electrical	25,000
TOTAL	\$350,000

Advantages of this system include:

- This system provides a pure backstop, similar to a tertiary clarifier with positive sludge removal, consistently able to meet effluent limits.
- Is Not Always Needed, Can Be Bypassed
- Least Amount of Chemical Use
- Reasonable Cost

We recommend this option be implemented. A new DAF can be constructed and installed in 2 months. We also recommend flow control be provided to the 90 ft. aeration basin to eliminate spikes and flow surges.

Implementation Plan

In order to implement this plan as quickly as possible, we recommend OFTI take the following actions:

1. Meet with DNR to review the new action/compliance plan.
2. Authorize McMahon Associates, Inc. to revise the Engineering Report and submit plans and specs of the revisions to DNR.
3. Order the DAF and other long lead time items.
4. Retain McMahon Inc. to Engineer, Procure and Construct the project.

Summary & Budget

A summary of the critical work tasks and budget for this work is attached.

TEV:hmh

Work Task	Top Priority	Deferred Action
Mini System		
Install used Blower	X	
Add 100 HP Motor & Proper Shieve	X	
VFD & DO Control		X
Flow Meter on RAS Line		X
Spare Rotating Assembly for RAR Pump	X	
Flow Control to Krofta	X	
001 System		
New 100 HP Blower	X	
New 100 HP Motor	X	
Piping & Valve Changes	X	
VFD & DO Control	X	
RAS/WAS Meters	X	
Backup DAF	X	
Flow Control to 90 ft. Basin	X	
Chlorination System for Filaments	X	

TEV:hmh

Preliminary Budget

Mini System

Install Used Blower at Basin #1	\$5,000
Add 100 HP Motor	\$3,500
Flow Control to Krofta	\$2,000

001 System

New 100 HP Blower	\$25,000
New 100 HP Motor	\$3,500
Piping, Valve Changes & Install	\$25,000
VFD & DO Control	\$75,000
RAS/WAS Meters	\$9,200
DAF System	\$350,000
Flow Control - 90 ft. Basin	\$5,000
Chlorination for Filaments	\$10,000
Mechanical - Misc.	\$25,000
Electrical	\$40,000

Subtotal \$578,200

Engineering \$50,000

Contingencies \$86,700

TOTAL \$714,900

TEV:hmh

December 18, 2006

Mr. Karl P. Roovers
Environmental Enforcement Specialist
Wisconsin Department of Natural Resources
North East Regional Headquarters
2984 Shawano Ave., P.O. Box 10448
Green Bay, WI 54307-0448

Dear Mr. Roovers:

This letter is in response to your December 7, 2006 letter where you requested a written commitment to remain in compliance and definitive steps to remain in compliance with the Oconto Falls waste water treatment facility permit requirements.

Since our meetings on March 23, 2006 where OFTI personnel outlined our commitment and plans to remain in compliance, the following activities have taken place.

OFTI hired McMahan & Associates to perform an analysis and to develop a detailed plan and specifications for new equipment for the OFTI mill to improve the waste water treatment facility. These plans were submitted in July of 2006 and approved by the WDNR in August 2006 all equipment was immediately placed on order following design. As soon as all equipment was received the mill was shut down for the installation.

Phase I was the addition of more aeration capacity. During this mill outage the 90 foot aeration basin was taken off line to remove and change out the aeration system. 172 Flexair 84p magnum diffuser units were installed October 25-27, 2006.

In the mini system basin #2, 36 existing aerators were changed to new Flexair 84p magnum diffusers. In addition, 36 more Flexair diffusers were added to basin #2. Now with 72 diffusers along with new technology this basin has more than double the air flow.

The additional aeration capacity in basin #2 and the 90 foot basin, has proven to be successful as dissolved oxygen levels increased immediately upon start up. Since start up one of the new blowers were shut down due to high levels of D.O.

The OFTI mill has also hired McMahan & Associates on a full time basis to assist the mill and operate the waste water treatment plant. The BOD average discharged from the mill during November 2006 was 759 compared to the permit level of 1504 pounds of BOD per day discharge.

In November 2006, the mill experienced a disruption in flow causing a wash out in solids to the river. A plan to improve the pumping action was submitted to the DNR in November 2006 and approval was obtained December 4th, 2006 to install a new gravity feed line. This line was placed in operation on December 15th and has eliminated surging problems to the clarifier.

To provide an additional cushion and remain in compliance the mill adjusted and continues to adjust the amount of outside EcoFibre pulp used to control the amount of BOD flowing to the waste water treatment plant. The extra cost incurred for this activity has been up to \$350,000 per month. The company has invested over \$470,000 in equipment and services implementing the Phase 1 portion of the waste water treatment plant's improvement plan.

The OFTI mill continues to be highly committed to be in compliance with its waste water discharge permit. Hiring outside contractors, purchasing and installing new equipment, and incurring extra operating costs by substituting outside recycled fiber pulp for wastepaper are activities we have completed since our last meeting. The next phase is being analyzed which could include new blowers, a clarifier change and additional aeration capacity.

OFTI will submit additional plans to the WDNR should further recommendations become necessary and is committed to continue to make changes to assure compliance of the waste water treatment plant.

Sincerely,

Ron Van Den Heuvel

①

AMENDMENT
To
Engineering
Report

OCONTO FALLS TISSUE Wastewater Treatment Plant

Prepared For
Oconto Falls Tissue, Inc.

Prepared By:



February 13, 2007

McM. No. O0046-960851.00
TEV:smdt

AMENDMENT To Engineering Report

OCONTO FALLS TISSUE Wastewater Treatment Plant

Prepared For

Oconto Falls Tissue, Inc.

Prepared By

McMAHON ASSOCIATES, INC.

Neenah, Wisconsin

February 13, 2007

McM. No. O0046-960323

TABLE OF CONTENTS

- I. BACKGROUND
- II. APPROVED PLAN
 - A. Upgrades To The First Treatment Plant
 - B. Upgrades To The Second Treatment Plant
- III. PLAN AMENDMENT
- IV. TESTING DATA
- V. IMPLEMENTATION PLAN

List Of Appendices

- Appendix A - Jar Test Reports
- Appendix B - Bench Scale Test Results

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McMAHON
ASSOCIATES
ENGINEERS | ARCHITECTS | SURVEYORS | PROJECT MANAGERS

AMENDMENT To Engineering Report

OCONTO FALLS TISSUE Wastewater Treatment Plant

Prepared For

Oconto Falls Tissue, Inc.

Prepared By

McMAHON ASSOCIATES, INC.

Neenah, Wisconsin

February 13, 2007

McM. No. O0046-960851.00

I. BACKGROUND

On April 28, 2006, McMahon Associates, Inc. prepared an Engineering Report for Oconto Falls Tissue, Inc. (OFTI) regarding Wastewater Treatment Plant improvements needed to comply with WPDES requirements. In July 2006, McMahon Associates, Inc. submitted plans and specifications to the Wisconsin Department of Natural Resources (DNR) for these improvements. These were approved by the DNR on August 10, 2006.

Since plan approval, several of the plant improvements were implemented, while others have not been. During this time period, considerable operations knowledge and experience with the Wastewater Treatment Plant has resulted in a re-evaluation of and modifications to the approved plan. This Amendment to the Engineering Report documents the modifications proposed.

II. APPROVED PLAN

The plan approved of August 10, 2006, contained the following major elements:

A. Upgrades To The First Treatment Plant

(Mini Plant System, which discharges to the Second Treatment Plant)

1. Aeration System Upgrades

- a. Provide one new 100-horsepower displacement blower with a Variable Frequency Drive (VFD) and Dissolved Oxygen (D.O.)

control loop.

- b. Install additional fine bubble tube diffusers in the first of the two aeration tanks (double the current number of diffusers from 72 to 144) operated in series.

B. Upgrades To The Second Treatment Plant

(Which discharges to the Oconto River through WPDES Permit Outfall 001)

1. Aeration System Upgrades

(Aeration Basin #1 - 90-foot diameter, 15-foot sidewater depth)

- a. Provide one new 100-horsepower positive displacement blower with a VFD and D.O. control loop.
- b. Replace the 75-horsepower motor on the existing blower with a new 100-horsepower motor and VFD.
- c. Replace the existing 90 ceramic diffusers with 930 new fine bubble membrane disc diffusers at constant submergence.
- d. Provide new 8-inch Return Activated Sludge (RAS) piping and a RAS flow meter, Waste Activated Sludge (WAS) flow meter, RAS/WAS automation with control valves, and VFD's for the RAS pumps.

2. Final Clarifier Upgrades

- a. Convert an existing intermediate 60-foot diameter clarifier tank with a 12-foot sidewater depth (not currently in use) into a new final clarifier with rapid sludge removal by installing new clarifier mechanisms and appurtenances (Riser Bro clarifier). Piping will also be reconfigured to allow gravity flow from the aeration basin to the new final clarifier.
- b. The existing 60-foot diameter final clarifier currently in use will be converted to a second standby/storm water final clarifier for peak flow events.

Upgrades A.1.b. and B.1.c. were completed in October 2006. Upgrades A.1.a., B.1.a., B.1.b. and B.1.d. are going to be made. Upgrade B.2.a. and B.2.b. are proposed to be revised.

III. PLAN AMENDMENT

The August 10, 2006 plan approval included converting the existing 60-foot diameter intermediate clarifier to a Riser Bro clarifier with scum removal. The existing 60-foot final clarifier would serve as a backup and/or used for peak flow events during storms.

Since plan approval, a new gravity flow line has been constructed to the existing 60-foot final clarifier, thereby eliminating pumping to the clarifier. Also, polymer is added to the clarifier influent to assist with settling.

Operations knowledge gained since August 10, 2006, include the following:

- A. The 90-foot aeration basin is complete mix, which tends to promote filamentous organism growth. Chlorinating the RAS helps, but a better, safer, more effective means of chlorinating the RAS is needed.
- B. The mixed liquor sludge easily floats and is difficult to settle.
- C. The existing final clarifier has poor hydraulic characteristics, and experiences short-circuiting and solids carry-over. This can be mitigated by providing a larger center well supported off the bridge, routing the mixed liquor inlet into the side of the center well with an energy dissipating baffle, leveling the effluent weirs and providing scum removal.

With this knowledge, floatation of mixed liquor suspended solids is a much more positive means of solids liquid separation than gravity settling only, particularly during filamentous blooms. Therefore, rather than providing a new final clarifier, we propose to install a Dissolved Air Flotation (DAF) unit after the existing final clarifier as a polisher. This type of arrangement (two final clarifiers in series) is common at paper mill wastewater treatment plants.

A schematic drawing of the proposed change is shown on PFD-1, as described as follows. All flow from the primary clarifier flows into the reaeration basin. All return sludge from the 60-foot final clarifier and DAF float would be mixed with primary effluent in the reaeration tank. Therefore, this tank will act like a selector and will help to control filaments. All flow from the reaeration tank will be pumped to the 90-foot Aeration Basin #1 with variable speed pumps. The river pump (which used to be used to pump primary effluent to the outfall during high reaeration tank levels) will be disconnected from the reaeration tank and reinstalled as a spare final effluent pump.

Mixed liquor from Aeration Basin #1 will flow by gravity to the existing final clarifier. Flow control valves will allow for partial diversion of mixed liquor from the final to the secondary effluent wet well to feed the DAF. This blend of diversion is by operator choice,

depending upon how well the final is working. Valving and piping will also be provided to allow for the Aeration Basin #1 or final to be bypassed in an emergency, operator choice.

Final clarifier effluent, clarifier scum and mixed liquor divert will be sent to the secondary effluent wet well to be pumped to the DAF. A new polymer system will be provided to condition the solids for floatation. Float solids and any heavy solids will flow by gravity to the reaeration basin. DAF effluent will flow by gravity to the final effluent wet well, suitable for discharge to Outfall 001. A permanent hypochlorite feed system will be installed to allow for chlorine addition for filamentous control to the point or settled RAS.

The 400 square foot DAF is sized to handle 2,000 gpm at 800 mg/l Total Suspended Solids (TSS) inlet, and remove the TSS by 80% at this loading. Normal final clarifier effluent TSS is 200 mg/l or less. Maximum solids loading to the DAF is 2 lbs./square foot/hour, or 19,200 lbs. of TSS.

IV. TESTING DATA

Two separate bench scale tests were undertaken to prove the DAF concept. Poseidon tested secondary clarifier effluent at TSS of 166 mg/l. Using 5 to 20 ppm polymer resulted in 79 to 94% TSS removal (refer to Appendix A). Similarly, a test by Sustainable Environmental Solutions used a secondary effluent sample at TSS of 176 mg/l and reduced it to 5 to 16 mg/l using 10 to 20 ppm polymer. Therefore, a DAF in polishing mode has been proven to work.

Currently, an Actiflo trailer-mounted unit, using ballasted sedimentation, is on-site polishing up to 300 ppm of secondary effluent. Ferric chloride and polymer are needed to condition the secondary effluent to allow for a sand assisted floc to develop and settle. To date, effluent suspended solids removal of 62 to 85% has been accomplished. This unit contributed to compliance with Biological Oxygen Demand (BOD) and TSS limits in January 2007. Results to date are included in Appendix B.

V. IMPLEMENTATION PLAN

Upon approval of the Amendment to the Engineering Report, the DAF will be placed on order and should be delivered in 30 to 45-days. Installation will take at least 30-days. The final clarifier should be repaired during a scheduled shut-down.

TEV:smdt
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APPENDIX A

JAR TEST REPORT

JAR TEST REPORT



DISSOLVED AIR FLOTATION LABORATORY STUDY WITH POSEIDON'S TECHNOLOGY

ST Paper, Oconto Falls

Application: *Mini System (Primary Effluent) and
Secondary Effluent Polishing*

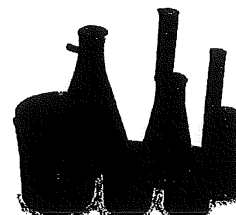
Location: Oconto Falls, Wisconsin

Submitted to: *Mr. Tom Vik
Mc Mahon Associates
Mr. KG Rajan
ST Paper*

Prepared by: Patrick Neault

Date: January, 16 2007

Les Traitements des Eaux Poseidon Inc.
1290, avenue Van Horne, Suite 310
Outremont, (Québec)
Canada H2V 4S2
Tél.: (514) 270-9593
Fax: (514) 270-9355



JAR TEST REPORT



3 Results and discussion

3.1 Primary Effluent (Mini System) Sample:

The results from the jar tests performed on the primary effluent (Mini System) sample are summarized in Table #1.

This water sample was characterised by a total suspended solids concentration of 1664 ppm, a turbidity of 2284 NTU and a pH of 6.77.

The jar tests showed that when using between 2 to 6 ppm of cationic polymer (Organopol 5420), the TSS concentration decreased to between 152 and 120 ppm for a removal efficiency of more than 91%. With these dosages, the turbidity decreased to between 121 and 105 NTU for a reduction efficiency of around 95%.

For dosages higher than 6 ppm, the TSS concentration in the clarified water increased and this is probably due to excess polymer in the clarified water. However, the flocs were more stable and stronger and the floating sludge was thicker at this dosage rate.

Table #1: Primary Effluent (Mini System)								
Flocculant Organopol 5420 (ppm)*	TSS (1.5 µm)			Turbidity			pH	Floc Formation
	In (ppm)	Out (ppm)	Eff. %	In NTU	Out NTU	Eff. %		
2	1664	145	91%	2284	121	95%	6,8	small
4		120	93%		113	95%		medium
6		152	91%		105	95%		large
10		163	90%		94	96%		large

*Dry Basis

JAR TEST REPORT



3.2 Secondary Clarifier Effluent Sample:

The results from the jar tests performed on the secondary clarifier effluent sample are summarized in Table #2.

This water sample was characterised by a total suspended solids concentration of 166 ppm, a turbidity of 87 NTU and a pH of 7.4.

The jar tests showed that when using between 5 to 20 ppm of cationic polymer (Organopol 5480), the TSS concentration decreased to between 35 and 10 ppm for a removal efficiency of between 79 to 94%. With these dosages, the turbidity decreased to less than 22 NTU for a reduction efficiency of 75% or higher.

The optimum floc formation was obtained at 10 to 15 ppm of polymer.

Table #2: Secondary Clarifier Effluent								
Flocculant Organopol 5480 (ppm)*	TSS (1.5 µm)			Turbidity			pH	Floc Formation
	In (ppm)	Out (ppm)	Eff. %	In NTU	Out NTU	Eff. %		
5	166	35	79%	87	22	75%	7,4	small
10		22	87%		17	80%		medium
15		18	89%		12	86%		large
20		10	94%		8	91%		large

*Dry Basis

JAR TEST REPORT



4 Conclusions

According to the jar test results, a single chemical program is effective in reducing the total suspended solids and reducing turbidity on both the primary and secondary clarifier effluent, when using Poseidon's Dissolved Air Flotation Technology.

Based on this study, with an optimum dosage of 4 to 6 ppm of cationic polymer, Organopol 5420, the **primary effluent** total suspended solids (TSS) decreased from 1664 ppm to between 120 and 152 ppm, which accounted for over 91% solids removal. The residual turbidity was in the range of 105 to 113 NTU for a reduction efficiency of 95%.

With an optimum dosage of 10 to 15 ppm of cationic polymer Organopol 5480, the **secondary clarifier effluent** total suspended solids (TSS) decreased from 166 ppm to approximately 20 ppm, which accounted for over 87% solids removal. The residual turbidity was 12 to 17 NTU for a reduction efficiency greater than 80%.

We conclude that the Oconto Falls Tissue, primary and secondary clarifier effluent can be treated effectively by dissolved air flotation with Poseidon's technology.

Sample From: Oconto Tissue - Oconto, WI**ChemTreat, Inc / Sustainable Environmental Solutions Bench Testing With WWT Sample - Performed On 1-30-07**

Sample	Floculant Information				Primary		Dosage		94	176	Comments On Test	
	Product	Type	% con.	dose - ppm	Coagulant	ppm	Coagulant	ppm				
Control	None	None	None	0.0	None	None	0	0	0	0	Control Test For TSS & Turbidity	
1	P817E	An Emulsion	0.25	10.0	P891L	10	9	9	8	9	Testing with inorganic coagulant, if appeared as if the	
2	P802E	An Emulsion	0.25	10.0	P891L	10	9	10	9	9	coagulant feed was not high enough, may need to look	
3	P802E	An Emulsion	0.25	10.0	P891L	5	10	10	10	10	at commodity type inorganics.	
4	P817E	An Emulsion	0.25	10.0	P891L	5	10	10	10	10	Single cationic emulsion testing	
8	P834E	Cat Emulsion	0.25	10.0	P8282L	20	9	9	9	9		
9	P831E	Cat Emulsion	0.25	10.0	P8282L	10	9	9	9	9		
10	P831E	Cat Emulsion	0.25	10.0	P823L	10	6	7	6	6		
11	P831E	Cat Emulsion	0.25	10.0	P891L	10	9	9	9	9		
12	P831E	Cat Emulsion	0.25	10.0	A108	30	5	5	5	5		
13	P817E	An Emulsion	0.25	10.0	A108	40	6	6	7	7		
14	P831E	Cat Emulsion	0.25	10.0	A108	50	10	10	9	9		
16	P831E	Cat Emulsion	0.25	10.0	P873L	10	7	8	5	5	Dual treatment program at lower cost	
17	P831E	Cat Emulsion	0.25	10.0	P873L	20	8	7	7	7		
18	P831E	Cat Emulsion	0.25	10.0	P873L	30	10	10	10	10		
19	P831E	Cat Emulsion	0.25	10.0	P817E	5	8	8	8	8		
20	P802E	An Emulsion	0.25	10.0	P896L	20	6	5	6	6		
21	P831E	Cat Emulsion	0.25	10.0	P896L	10	8	8	8	8		
22	P831E	Cat Emulsion	0.25	10.0	P891L	20	9	9	9	9		
23	P831E	Cat Emulsion	0.25	10.0	P890L	30	9	9	8	8		
24	P817E	An Emulsion	0.25	10.0	A108	60	7	7	7	7		
25	P817E	An Emulsion	0.25	15.0	A108	100	7	7	7	7		
26	P831E	Cat Emulsion	0.25	10.0	P822L	10	7	7	8	8		
27	P831E	Cat Emulsion	0.25	10.0	P822L	20	8	8	8	8		
28	P831E	Cat Emulsion	0.25	10.0	P892L	10	9	9	9	9		
29	P838E	Cat Emulsion	0.25	10.0	P892L	10	9	9	9	9		
30	P838E	Cat Emulsion	0.25	10.0	P895L	10	8	8	8	7		
31	P835E	Cat Emulsion	0.25	10.0	P895L	15	10	9	9	9		
32	P835E	Cat Emulsion	0.25	10.0	P895L	20	10	10	10	10		
34	P835E	Cat Emulsion	0.25	12.0	None	0	10	9	9	9	Testing five best single component high charge	
36	P846E	Cat Emulsion	0.25	12.0	None	0	10	9	9	9	cations with varying molecular weights	
37	P834E	Cat Emulsion	0.25	12.0	None	0	9	9	9	9		

Testing Observations & Conclusion: The overall results from the jar tests confirmed that the wastewater stream from Oconto Falls Tissue can be chemically and mechanically treated to obtain their goal of less than 20 mg/L total suspended solids. The turbidity test was run utilizing a DR890 which reads out in FTU, however the conversion to NTU is 1:1. The total suspended solids test was run utilizing preweighed and dried filter pads, along with a 4 decimal point gram scale. The easiest program to implement initially is a single component, high molecular weight cationic emulsion at a specific molecular weight. We would be happy to assist you with mixing energy needed to optimize the feedpoint and proper mixing. In addition to the single cationic emulsions we ran some dual program testing to see if improved suspended solids removal could be obtained at a lower cost. Several very specific types of coagulants showed the potential and if that becomes a point of interest in the future, we would be happy to perform work necessary to develop a strong program. Keeping the initial implementation as simple as possible, our P831E and P838E were able to treat the sample to below 20 mg/L at a dosage range of 10-15 mg/L. Interpreting the data that was obtained on the sample given to us, the chemical program required to properly remove solids will be approximately \$240 / MM gallons treated. This amount can vary somewhat if depending on the variability of the wastewater stream itself. Prior to any implementation we would recommend running several more days of studies.

APPENDIX B

BENCH SCALE TEST RESULTS

(To Be E-Mailed Electronically)

August 30, 2006

Wisconsin Department of Natural Resources
Mr. Bruce Oman, Basin Engineer
101 Ogden Rd.
Peshtigo, WI 54157

Re: WWTP Upgrade Status Report

Dear Mr. Oman,

On behalf of Oconto Falls Tissue, Inc. I have been asked to prepare the following Project Status Report, which the Department requested in the annual compliance evaluation inspection summary, dated July 26, 2006. As we are all aware the Mill has and continues to struggle with treating the wastewater generated in the paper making process. The efforts made by the DNR to expedite the approval of the proposed treatment plant upgrades are greatly appreciated and hopefully will be the catalyst for a timely resolution to the current treatment deficiencies.

The following information is intended to provide the Department with an overview of OFTI's efforts and intentions in regard to the implementation of the recently approved treatment plant upgrade project. As you are aware the Mill is currently involved in an ownership transition. This change in ownership will provide an infusion of capital, which will in part fund the proposed upgrades. With this in mind it is important to understand that the exact timing of some phases of the upgrades are difficult to identify as their scheduling is dependent on the change in ownership.

Recognizing that the load generated currently stresses the Mill's treatment capabilities, OFTI intends to reduce the load to the treatment plant to a treatable level. OFTI intends to do this through the use of pulp products from outside sources and limit the amount of recycled wastepaper pulped on site. The outside pulp will either be purchased from independent pulp mills or generated at the Mills sister company, Eco-Fibre, Inc. in Depere, WI. The intent is to use this practice until the proposed upgrades are completed and the onsite treatment capabilities are adequate to treat the load of the Mill.

OFTI has placed orders and anticipates shipment of the aeration equipment to complete the proposed upgrades to the mini system by mid-September, with installation completed by the end of September. A contractor has been retained for the installation. The proposed automated controls and additional blower will be added once the change in ownership has occurred. An updated schedule will be provided to the Department once a more defined timetable can be developed. This particular project was initiated first because it was determined that it could be completed relatively quickly, provide immediate relief to the BOD loading at the 001 plant, and help minimize treatment plant odors.

The next phase of the project implementation would be the purchase and installation of the proposed aeration equipment for the 001 plant. The purchase of the equipment is currently in process and the delivery and installation will coincide with an anticipated Mill shut down. The exact dates are yet to be determined because of the ownership transition, but the shut down appears likely to be held sometime between the end of September and mid-October of 2006. The Department will be advised as the actual schedule when it available.

The final phase of the project implementation would be to address the final clarifier and associated piping issues. The incoming ownership unfortunately did not have much involvement with the Mill's consultant, as the plans were prepared. It appears that the incoming ownership has interest in evaluating some alternate technologies for clarification that would result in a higher quality effluent that could be easily recycled for process use. This evaluation is expected to be conducted as expeditiously as possible so that full project implementation can be completed in a timely manner. Should an alternate technology be preferred the Department would be presented with appropriate submittals for approval. The Department will be advised of the actual implementation schedule as soon as it is developed.

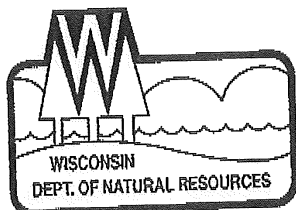
I hope that this report has provided the Department with an overview of the intentions of the Mill. More specific timetables should be forwarded to the Department in the coming weeks as the scheduling and funding is confirmed. As you are aware I am moving on to a new opportunity and will no longer be the contact for the Mill. Mr. Donnie Parks will be available as a contact until a new contact is identified. I have enjoyed working with you and have appreciated your guidance over the past several months. If there are any questions please feel free to give me a call at 920-495-0299.

Sincerely,

Tod Maurina

(29)

DEC 18 '06 8:20 FROM OCONTO FALLS TISSUE TO 14142735188 PAGE.002/002



State of Wisconsin \ DEPARTMENT OF NATURAL RESOURCES

Jim Doyle, Governor
 Scott Hassett, Secretary
 Ronald W. Kazmierczak, Regional Director

Northeast Region Headquarters
 2984 Shawano Ave., P.O. Box 10448
 Green Bay, Wisconsin 54307-0448
 Telephone 920-662-5100
 FAX 920-662-5413
 TTY 920-662-5112

December 7, 2006

MR STEVE LEA PLANT MANAGER
 OCONTO FALLS TISSUE INC
 106 EAST CENTRAL AVENUE
 OCONTO FALLS, WI 54154

Casetrack# 2006-NEEE-005
 WPDES Permit: WI-0000531
CERTIFIED MAIL
 Return Receipt Requested

Subject: **RESPONSE REQUESTED**

Dear Mr. Lea:

The purpose of this letter is to request an update from you regarding the compliance status of the Oconto Falls Tissue, Inc. (OFTI) wastewater treatment facility. Since the date of the enforcement conference (March 23, 2006) OFTI has taken limited steps to upgrade its facility but still has recurring permit exceedances.

By no later than Monday, December 18, 2006, please provide to me at the address in the letterhead your written commitment to remain in compliance and definitive steps you will take to do so.

As previously stated, the Department is very concerned about the ongoing wastewater exceedances by OFTI, the length of time that the exceedances have continued and the lack of appropriate response. If you fail to return to compliance, State law leaves the Department with few options other than to escalate enforcement actions.

Please be advised that the Department is authorized to seek injunctive or other appropriate relief for violations of pollution discharge elimination laws, including forfeitures of no more than \$10,000 per day of violation, pursuant to s. 283.91(2), Wis. Stats. Any person who willfully or negligently violates laws relating to pollution discharge elimination may be fined not more than \$25,000 per day of violation or imprisoned for not more than 6 months or both, pursuant to s. 283.91(3), Wis. Stats. Each day of violation is considered a separate offense.

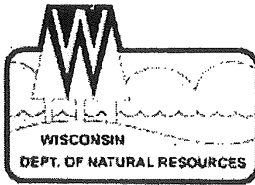
If you have technical questions regarding your wastewater system, please contact Wastewater Engineer Mr. Bruce Oman at (715) 582-5012. If you have questions regarding this letter, please contact me at (920) 662-5409.

Sincerely,

Karl P. Roovers
 Environmental Enforcement Specialist

Cc: B. Oman - Peshtigo
 R. Stoll - NER
 C. Hammer - LS/5
 WT/2

25



State of Wisconsin \ DEPARTMENT OF NATURAL RESOURCES

Jim Doyle, Governor
Scott Hassett, Secretary

101 South Webster Street
P.O. Box 7921
Madison, WI 53707-7921
Telephone (608) 266-2621
FAX (608) 267-3579
TTY Access via relay - 711

August 10, 2006

IN REPLY REFER TO: S-2006-0644

Don Parks
Plant Manager
Oconto Falls Tissue, Inc.
1555 Glory Road
Green Bay WI 54304

Dear Mr. Parks:

The Division of Water is conditionally approving plans and specifications for upgrading the existing wastewater treatment facilities serving Oconto Falls Tissue (OFT) located at Oconto Falls, Wisconsin. The plans and specifications were submitted under the signature of Thomas E. Vik, Professional Engineer, McMahon Associates, Neenah, Wisconsin, and received for approval on July 10, 2006.

Plans and specifications and design calculations were submitted for upgrading the existing wastewater treatment facilities for OFT based on recommendations from a detailed evaluation using current production and wastewater flows and pollutant loadings presented in an engineering report submitted by Tom Vik, McMahon Associates, dated April 28, 2006. An additional detailed evaluation of treatment facilities capability would need to be submitted in an engineering report for any future proposed increases in production.

OFT's existing wastewater treatment facilities include 2 treatment plants operated in series. Part of OFT's wastewater (screw press filtrate and wastewater from the recycled fiber mill (0.48 MGD max. month in 2005)) is treated in the first treatment plant (mini plant system) consisting of two activated sludge tanks in series followed by a Krofta dissolved air floatation unit (DAF) for solids removal. Treated wastewater from the DAF and tissue paper machine wastewater is treated in a second treatment plant (Outfall 001 plant system) consisting of a bar screen, primary clarifier, reaeration basin, aeration basin (#1, complete mix activated sludge), final clarifier and strainer. Final treated effluent discharges to the Oconto River via an outfall designated as 001 in WPDES permit No. WI-0000531-07 into the turbine intakes for a hydroelectric generator (at an annual and monthly average flow rate of 0.8 MGD; 1.1 MGD monthly avg. max. and 1.8 MGD max. day for data from Jan. 2005 to June 2006).

A brief summary of salient upgrades to OFT's existing treatment facilities in the submitted plans include but are not limited to the following:

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Upgrades to the First Treatment Plant (mini plant system which discharges to the second treatment plant)

Aeration System Upgrades

- Provide one new 100 HP positive displacement blower with a VFD (variable frequency drive) and dissolved oxygen control loop.
- Install additional fine bubble tube diffusers in the first of the two aeration tanks (double the current number of diffusers from 72 to 144) operated in series.

Upgrades to the Second Treatment Plant (which discharges to the Oconto River thru WPDES permit Outfall 001)

Aeration System Upgrades (aeration basin #1—90 ft. diameter, 15 ft. side water depth)

- Provide one new 100 HP positive displacement blower with a VFD and dissolved oxygen control loop.
- Replace the 75 HP motor on the existing blower with a new 100 HP motor and a VFD.
- Replace the existing 90 ceramic diffusers with 930 new fine bubble membrane disc diffusers at constant submergence.
- Provide new 8 inch RAS (Return Activated Sludge) piping and a RAS flow meter, WAS (waste activated sludge) flow meter, RAS/WAS automation with control valves and VFDs for the RAS pumps.

Final Clarifier Upgrades

- Convert an existing intermediate 60 ft. diameter clarifier tank with a 12 ft. side water depth (not currently in use) into a new final clarifier with rapid sludge removal by installing new clarifier mechanisms and appurtenances (Riser Bro clarifier). Piping will also be reconfigured to allow gravity flow from the aeration basin to the new final clarifier.
- The existing 60 ft. diameter final clarifier currently in use will be converted to a second standby/stormwater final clarifier for peak flow events.

The plans and specifications are hereby approved in accordance with s. 281.41, Stats., as attested by affixing on them the stamp of approval, Number S-2006-0644, subject to the following conditions:

1. That all existing treatment facilities be operated as effectively as possible during the course of the construction period and that the proposed system be operated effectively when it is placed in operation.
2. That the Department's Basin Wastewater Engineer, Bruce Oman in Peshtigo be notified when construction has commenced and again when the facilities are placed in operation.
3. That a certified operator be retained to operate the treatment facilities when they are placed in operation.
4. That an operation and maintenance manual for operation of the new or modified treatment system be prepared and submitted to the Department before placing the system into operation.
5. That all solids and sludges resulting from the treatment of these wastewaters be disposed of in accordance with ch. NR 214, Wis. Adm. Code (Land Application of Industrial Wastes) and the WPDES permit for the facility or any applicable Solid and Hazardous Waste Regulations (in chs. NR 500 to 590 and 600 to 690, Wis. Adm. Codes).

**State of Wisconsin \ DEPARTMENT OF NATURAL RESOURCES**

Jim Doyle, Governor
Scott Hassett, Secretary

101 South Webster Street
P.O. Box 7921
Madison, WI 53707-7921
Telephone (608) 266-2621
FAX (608) 267-3579
TTY Access via relay - 711

December 6, 2006

IN REPLY REFER TO: S-2006-1047

Mr. Stephen Lea
 Plant Manager
 Oconto Falls Tissue, Inc.
 106 E. Central Ave.
 Oconto Falls, WI 54154

Dear Mr. Lea:

The Division of Water is conditionally approving plans for an improvement to the existing wastewater treatment facilities serving Oconto Falls Tissue located at Oconto Falls, Wisconsin. The plans were submitted under the signature of Thomas E. Vik, Professional Engineer, McMahon Associates, Neenah, Wisconsin, and received for approval on December 4, 2006.

A new 12 inch PVC pipe will be installed to allow gravity flow of mixed liquor from the existing 90 ft. diameter aeration tank trough to the existing 60 ft. diameter final clarifier center well. This change will eliminate the need for the current procedure for transferring mixed liquor to the final clarifier by pumping from an undersized wet well. The current practice of pumping mixed liquor has been reported to destroy floc resulting in periodic loss of solids over the final clarifier weir and inability to maintain a consistent MLSS concentration in the aeration tank.

The proposed improvement has been indicated to be an interim measure and is not being approved as a substitute for proposed extensive final clarifier improvements (listed below) approved by the Division of Water in a plan approval (No. S-2006-0644) dated August 10, 2006.

Final Clarifier Upgrades (from Plan Approval No. S-2006-0644 dated August 10, 2006)

- *Convert an existing intermediate 60 ft. diameter clarifier tank with a 12 ft. side water depth (not currently in use) into a new final clarifier with rapid sludge removal by installing new clarifier mechanisms and appurtenances (Riser Bro clarifier). Piping will also be reconfigured to allow gravity flow from the aeration basin to the new final clarifier.*
- *The existing 60 ft. diameter final clarifier currently in use will be converted to a second standby/stormwater final clarifier for peak flow events.*

The plans and specifications are hereby approved in accordance with s. 281.41, Stats., as attested by affixing on them the stamp of approval, Number S-2006-1047, subject to the following conditions:

1. That all existing treatment facilities be operated as effectively as possible during the course of the construction period and that the proposed system be operated effectively when it is placed in operation.
2. That the Department's Basin Wastewater Engineer, Bruce Oman in Peshtigo, be notified when construction has commenced and again when the facilities are placed in operation.

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3. That all solids and sludges resulting from the treatment of these wastewaters be disposed of in accordance with ch. NR 214, Wis. Adm. Code (Land Application of Industrial Wastes) and the WPDES permit for the facility or any applicable Solid and Hazardous Waste Regulations (in chs. NR 500 to 590 and 600 to 690, Wis. Adm. Codes).
4. That the Water Management Investigator of the Northeast, Robert Rosenberger in Peshtigo, be contacted to determine whether permits under ch. 30, Stats. are required and, if needed, that no construction begin until such permits are obtained.
5. That a competent resident inspector be provided during the course of construction.
6. That the improvement(s) be installed in accordance with the plans and specifications and above conditions, or subsequent essential and approved modifications.

These plans and specifications have been reviewed in accordance with s. 281.41, Stats. Where necessary, plans and specifications should be submitted to the Department of Commerce, Division of Buildings and Safety or other state or local agencies to insure conformance with applicable codes or regulations of such agencies.

The Division of Water reserves the right to order changes or additions should conditions arise making this necessary.

This approval is not to be construed as a Department determination on the issuance of a Wisconsin Pollutant Discharge Elimination System permit or an opinion as to the ability of the proposed system to comply with effluent limitations in such permit, or an approval for any activities requiring a permit under ch. 30 or 31, Stats.

Tangible personal property which becomes part of a waste treatment or pollution abatement plant or equipment, may be exempt from sales tax under s. 77.54(26), Stats. Similarly, property purchased or constructed as a waste treatment facility and used for the treatment of industrial wastes may be exempt from general property taxes under s. 70.11(21)(a), Stats. A prerequisite to exemption is the filing of a statement on forms prescribed by the Department of Revenue. To obtain the necessary forms, and information on whether or not your property qualifies for these exemptions, please contact the Department of Revenue, P.O. Box 8933, Madison, Wisconsin, 53708.

In case installation of these improvements has not been commenced within two years from this date, this approval shall become void. After two years, therefore, new application must be made for approval of these or other plans and specifications before any construction is undertaken.

If you believe you have a right to challenge this decision made by the Department, you should know that Wisconsin statutes, administrative codes and case law establish time periods and requirements for reviewing Department decisions.

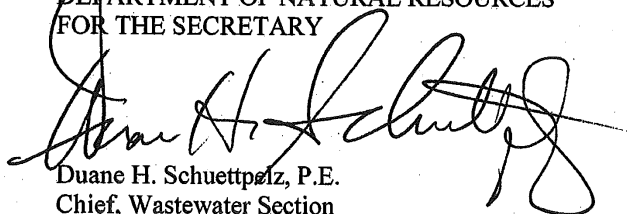
To seek judicial review of the Department's decision, sections 227.52 and 227.53, Stats., establish criteria for filing a petition for judicial review. Such a petition shall be filed with the appropriate circuit court and shall be served on the Department. The petition shall name the Department of Natural Resources as the respondent.

To request a contested case hearing pursuant to section 227.42, Stats., and ch. NR 2, Wis. Adm. Code, you have 30 days after the decision is mailed, or otherwise served by the Department, to serve a petition for hearing on the Secretary of the Department of Natural Resources. The filing of a request for a contested case hearing is not a prerequisite for judicial review.



David Hantz, P.E.
Wastewater Engineer
Wastewater Section

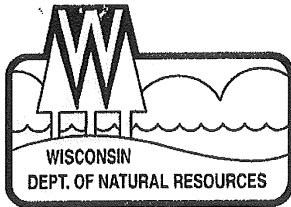
STATE OF WISCONSIN
DEPARTMENT OF NATURAL RESOURCES
FOR THE SECRETARY



Duane H. Schuettpelz, P.E.
Chief, Wastewater Section
Bureau of Watershed Management

cc: Northeast
Bruce Oman
Permit File
Tom Vic, McMahon Assoc.
Plan File (2 copies)

10



State of Wisconsin \ DEPARTMENT OF NATURAL RESOURCES

Jim Doyle, Governor
Scott Hassett, Secretary
Ronald W. Kazmierczak, Regional Director

Northeast Region Headquarters
2984 Shawano Ave., P.O. Box 10448
Green Bay, Wisconsin 54307-0448
Telephone 920-662-5100
FAX 920-662-5413
TTY Access via relay - 711

December 15, 2005

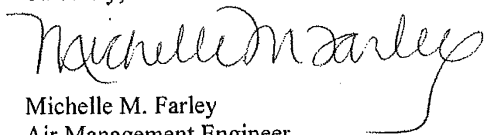
Jim Kellam, Environmental Coordinator
Oconto Falls Tissue, Inc.
1555 Glory Road
P.O. Box 28316
Green Bay, Wisconsin 54324

Subject: Inspection of Oconto Falls Tissue, Inc. – Oconto Falls
FID # 443044470

Dear Mr. Kellam:

I appreciate the assistance you and Jim Rotier provided me on November 2, 2005, with the air inspection and compliance evaluation of the Oconto Falls Tissue facility in Oconto Falls. Attached is the Report prepared as a result of my visit. Please make a note of the recommendations in the Recommendations / Conclusions section of the report. If you have any questions about any part of the report, please feel free to contact me in the Green Bay office at 920-662-5495.

Sincerely,


Michelle M. Farley
Air Management Engineer

cc: NER files
Jim Rotier, Plant Manager – Oconto Falls facility

4103 107876 JA 71 04 (C) 72 784870 7000 4W 7 1942

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**DEPARTMENT OF NATURAL RESOURCES
NORTHEAST REGION
FULL AIR COMPLIANCE EVALUATION (FCE) SUMMARY**

FID: 443044470**FCE/SITE VISIT DATE:** November 2, 2005**FACILITY NAME AND LOCATION:**

Oconto Falls Tissue, Inc.
106 E. Central Avenue
Oconto Falls, Wisconsin

EPA-COMMITTED FCE Yes

SOURCE TYPE: ☒ FOP
 ☐ FESOP
 ☐ SOP
 ☐ MEGA

COUNTY: Oconto**INSPECTION PARTICIPANTS:**

Jim Kellam, Human Resources –PCDI/Oconto Falls Tissue
 Jim Rotier, Plant Manager – Oconto Falls Tissue
 Michelle Farley – DNR/NER

APPLICABLE AIR PROGRAMS:

☒ SIP
☐ NSPS
☐ NESHAP/MACT
☒ TOXIC

TOTAL ACTUAL FACILITY EMISSIONS IN TONS/YEAR:

	PM / PM ₁₀	SO ₂	NO _x	VOC	CO	HAP
2004	18.28 / 17.29	0.14	38.32	51.22	19.47	None reported
2003	17.04 / 16.07	0.20	47.81	55.67	27/75	None reported
CLASS	B	A	A	A	B	Major
AREA	Attainment	Attainment	Attainment	Attainment	Attainment	N/A

(Data above is from the 2003 and 2004 emission inventory.)

IS FACILITY IN COMPLIANCE WITH ALL WISCONSIN AIR REGULATIONS?
 and Discussion Section.

No – See Inspection Field Notes

INSPECTOR SIGNATURE/DATE:

Michelle Farley 12/14/05
TITLE: Air Management Engineer

SUPERVISOR SIGNATURE/DATE:

Richard Wull 12-15-05
TITLE: Northeast Region Air Supervisor

cc: Bureau of Air Management – AM/7 INSP

ST PAPER 1562

P03 / S03 – Dispersion System – Last modified in 1994. The dispersion system is the next step in the de-inking process where the slurry is treated with hydrogen peroxide, sodium silicate, caustic soda and epsom salts. From the dispersion system, the slurry is sent on to the wet room. There are very little emissions from the process, therefore, limits were not included in the operating permit issued in 2004.

P04-1 / S04-1 – Tissue Machine (TM) #1 – Installed in 1998. TM #1 is a 135" Voith Crescent tissue machine with a 14.5 mmBtu/hr natural gas fired dryer. TM #1 has a production capacity of 100 tons/day. Emissions from the dryer are exhausted uncontrolled through S04-1. Currently, particulate emissions are vented uncontrolled from the three building vents (designated as S04-1-1, S04-1-2, and S04-1-3) located above the tissue machine, however, due to past occurrences of tissue fallout that may be attributed to TM #1, the facility installed dry filters in the three vents above the tissue machine in December 2003.

P04-2 / S04-2 – TM #2 – Installed in 2000. TM #2 is a 106" Voith Crescent tissue machine with a 11.6 mmBtu/hr natural gas fired dryer. TM #2 has a production capacity of 100 tons/day. The ductwork from dryer hood from TM #2 has two inline filters for control of particulate emissions, then emissions are vented through S04-2. Particulate emissions from the five building vents (designated as S04-2-1, S04-2-2, S04-2-3, S04-2-4 and S04-2-5) located above the tissue machine are controlled with dry filters which were installed in early 2003.

P05 / S05 – Wet Room – The wet room is where they clean and screen the paper pulp. Emissions from the wet room were determined to be indoor fugitive emissions.

P06 / S06 / C06 – Ash Handling System – Constructed in 1963. This system is no longer in use because the boilers were modified so that they are capable of firing only natural gas and fuel oil. Therefore, it was not included in the operating permit.

F07 – Unpaved Roads – A source of fugitive dust emissions from vehicle traffic.

F08 and F09 – Coal Pile and Wood Pile – Used to store fuel for the boilers, however, since the boilers can only fire natural gas and fuel oil, these piles are no longer in existence, therefore, it was not included in the operating permit.

B25 / S10 – 57 mmBtu/hr Boiler – Constructed in 1955. This boiler has the capability to burn natural gas with #2 fuel oil as a backup. Emissions are uncontrolled. Currently, the boiler is out of commission.

B26 / S10 – 57 mmBtu/hr Boiler - Constructed in 1963. This boiler is a multi-fuel fired boiler equipped with 3 spreader stokers with a dumping grate system. It has the capability to burn coal, natural gas, wood, oil or wastewater treatment plant sludge. However, the facility has discontinued burning all but natural gas and fuel oil as a backup, and has committed to those restrictions in its operating permit. Emissions from the boiler are controlled by a multiclone. According to the 2002 emissions inventory, this boiler did not operate in 2002. Further, according to facility personnel, this boiler is only used when B27 is down for yearly maintenance.

B27 / S17 – 107 mmBtu/hr Boiler – Constructed in 1969. This is a single-pass package boiler with the capability to burn natural gas and fuel oil as a backup. Emissions are uncontrolled. According to the 2002 emissions inventory, this boiler has not fired fuel oil for a number of years.

SOURCE	POLLUTANT	LIMITATION	UNDERLYING REGULATION	COMPLIANCE DEMONSTRATION	COMPLIANCE STATUS
		May not produce more than 3041.6 tons of reeled tissue per month, averaged over 12 consecutive months	NR 405.08	recordkeeping	Compliance - Since permit issuance, high = 2861.6 tons in 5/2004
		Stack height at least 47 feet, stack diameter no more than 3 feet	Stat. 285.65(3)	On-site blueprints or records	Compliance
	Visible emissions	20% opacity	NR 431.05	Fire only natural gas in dryers	Compliance - natural gas only
				Same as for particulate matter	See notes for particulate matter
	Volatile organic compounds	1.4 lbs VOC/reeled ton of tissue produced	NR 405.08	Recordkeeping and calculations	Compliance - since permit issuance, high = 1.26 lbs VOC/reeled ton in 3/2005
		May not produce more than 3041.6 tons of reeled tissue per month, averaged over 12 consecutive months	NR 405.08	Recordkeeping	Compliance
	Nitrogen oxides	0.1 lb/mmBtu	NR 405.08	Fire only natural gas	Compliance - natural gas fired only
		Use of low-NOx burners on dryers	NR 405.08	recordkeeping	Compliance - records
	Carbon monoxide	Fire only natural gas	Stat. 285.65(3) and NR 407.09(4)(a)3.b.	recordkeeping	Compliance - records
	Sulfur dioxide	Fire only natural gas	NR 405.08	recordkeeping	Compliance - records
P04-2/S04-2 Tissue Machine #2 Constructed August 2000	Particulate Matter	4.75 lbs/hr	NR 405.08	Fire only natural gas in dryers	Compliance - natural gas fired only
				Equip building vents S04-2-1 to S04-2-5 with dry filters	Compliance - vents are equipped with dry filters

[REDACTED]

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SOURCE	POLLUTANT	LIMITATION	UNDERLYING REGULATION	COMPLIANCE DEMONSTRATION	COMPLIANCE STATUS
B25 and B26/S10 45 mmBtu/hr boiler constructed 1955	Particulate matter	0.15 lbs/mmBtu	NR 415.06(1)(a)	Fire only natural gas	Compliance – B25 no longer in service, B26 natural gas fired only
		Stack height at least 220 feet, stack diameter no more than 9.0 feet	Stat. 285.65(3)	Recordkeeping	Compliance
	Visible emissions	40% opacity	NR 431.04(1)	Fire only natural gas	Compliance – natural gas fired only
	Sulfur dioxide	Sulfur content of fuel oil no more than 0.5% by weight	Stat. 285.65(7)	Fuel analysis and recordkeeping	Not applicable – no fuel oil fired
		Total amount of #2 fuel oil in B25, B26 and B27 combined no more than 423,667 gals/month, averaged over 12 consecutive months	Stat. 285.65(7)	Recordkeeping	Not applicable – no fuel oil fired
B27/S17 107 mmBtu/hr package boiler constructed 1969 (MOP 443044470-J01)	Particulate matter	0.15 lbs/mmBtu	NR 415.06(1)(a)	Use of natural gas or #2 fuel oil	Compliance – used on a minimal basis, natural gas fired only
		Stack height at least 60 feet, stack diameter no more than 5.0 feet	Stat. 285.65(3)	Recordkeeping	Compliance
	Visible emissions	40% opacity	NR 431.04	Use of natural gas	Compliance – natural gas fired only
	Sulfur dioxide	Sulfur content of fuel oil no more than 0.5% by weight	Stat. 285.65(7)	Fuel analysis and recordkeeping	Not applicable – no fuel oil fired
		Total amount of #2 fuel oil in B25, B26 and B27 combined no more than 423,667 gals/month, averaged over 12 consecutive months	Stat. 285.65(7)	Recordkeeping	Not applicable – no fuel oil fired

[REDACTED]

Page 325 of 385

RESULTS OF PREVIOUS EMISSION TESTS:

SOURCE	TEST DATE	POLLUTANT(S)	RESULT	COMMENTS
TM #2 Dryer Stack	June 26, 2002	Particulate matter	4.05 lbs/hr	Test requested by DNR in response to tissue fallout complaints

SUMMARY OF PREVIOUS COMPLAINTS:

COMPLAINT DATE	COMPLAINT DESCRIPTION	FOLLOW-UP ACTION	COMMENTS
June 20, 2001	Tissue fallout in neighboring residential area	See Enforcement Actions	None
June 30, 2001	Tissue fallout in neighboring residential area	See Enforcement Actions	None
July 16, 2001	Tissue fallout in neighboring residential area	See Enforcement Actions	None
January 16, 2002	Tissue fallout in neighboring residential area	Contact with facility followed by facility investigation.	None
July 2, 2002	Tissue fallout in neighboring residential area	Contact with facility followed by facility investigation.	None
September 18, 2002	Tissue fallout in neighboring residential area	Contact with facility followed by facility investigation. Facility decides to install filters on tissue machine stacks.	None
September 22, 2002	Tissue fallout in neighboring residential area	Contact with facility followed by facility investigation. Facility decides to install filters on tissue machine stacks.	None
May 21, 2003	Tissue fallout in neighboring residential area	Contact with facility followed by facility investigation.	None
July 14, 2003	Tissue fallout in neighboring residential area	Contact with facility followed by facility investigation.	The number of tissue fallout incidences has decreased significantly since facility has installed filters. This particular incidence was attributed to a malfunction on TM #1. The facility has decided to install dry filters on vents from TM #1 also.
July 23, 2004	Tissue fallout in neighboring residential area	Contact with facility followed by facility investigation.	This incidence was attributed to a malfunction on TM #2.

[REDACTED]

[REDACTED]

[REDACTED]

- No annual report (to be submitted with annual compliance certification) was submitted outlining facility efforts to reduce chloroform.
- The facility is required to keep records of tissue machine #1 and tissue machine #2 filters changes. Further, the filters are required to be changed once per week. There were no records at all for the tissue machine #1 filters, and for the tissue machine #2 filters, it appears that filters were not changed weekly, some records are missing, and the records do not indicate which stacks filters were changed.

I asked Mr. Kellam to follow up on the above items. In regards to the Boiler MACT issue, he informed me I should contact the consultant, Dan Guido, who prepared the letter. Regarding the second issue, Mr. Kellam wasn't aware that a report should be submitted, and will do so for the next reporting period (Calendar year 2005). Regarding the third issue, further investigation by Mr. Kellam did not turn up the missing records for TM #1. However, he did submit a revised format for keeping records of filter changes on the tissue machines.

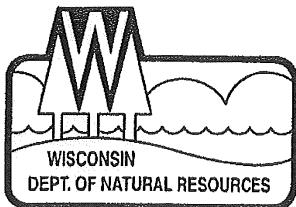
Mr. Guido was contacted regarding the HAPs issue. In a voice mail message to the DNR engineer on November 29, 2005, Mr. Guido stated that in fact, the facility is major for HAPs by virtue of its chloroform emissions, and should have reported such emissions on the 2003 and 2004 air emissions inventory. A review of the air emissions inventory was conducted, and in 2001 and 2002, the facility reported chloroform emissions at a level of 5412 lbs/yr in 2001 and 8255 lbs/yr in 2002. Furthermore, the preliminary determination for permit # 443044470-P01 dated in 2004 was reviewed, and in fact, the potential emissions of chloroform are greater than 10 tons per year, and the potential emissions of a combination of HAPs is greater than 25 tons per year. And further, the facility's required recordkeeping for part of 2004 and 2005 revealed chloroform emissions.

As a result of the observations made during the inspection and a review of records and data during and after the inspection, the following violations are noted:

1. No semiannual reports were submitted in September 2004 and September 2005, in violation of Operation Permit #443044470-P01 (Permit), Condition I.H.4.b.(1).
2. No annual report was submitted outlining facility's investigation of technologies to reduce chloroform emissions on the Broke Pulper (P01/S01) – in violation of Permit Condition I.A.1.c.(4).
3. Facility failed to report facility chloroform emissions in the air emissions inventory for calendar years 2003 and 2004, in violation of Wisconsin Administrative Code NR 438.03(1)(a).
4. Facility failed to keep records of filter checks and replacements for Tissue Machine #1, in violation of Permit Condition I.D.1.c.(4).
5. Records of Tissue Machine #2 filter changes indicate filters are not being changed or inspected weekly, in violation of Permit Condition I.D.1.b.(3).
6. Records of Tissue Machine #2 filter changes do not indicate that all stack filters (1-5) are being changed or inspected weekly, in violation of Permit Condition I.D.1.c.(4).

ST PAPER 1572

(11)



State of Wisconsin \ DEPARTMENT OF NATURAL RESOURCES

Jim Doyle, Governor
 Scott Hassett, Secretary
 Ronald W. Kazmierczak, Regional Director

Northeast Region Headquarters
 2984 Shawano Ave., P.O. Box 10448
 Green Bay, Wisconsin 54307-0448
 Telephone 920-662-5100
 FAX 920-662-5413
 TTY Access via relay - 711

January 3, 2006

Jim Kellam, Environmental Coordinator
 Oconto Falls Tissue, Inc.
 1555 Glory Road
 P.O. Box 28316
 Green Bay, Wisconsin 54324

Subject: LETTER OF NONCOMPLIANCE
 Oconto Falls Tissue Mill, Oconto Falls – FID # 443044470

Dear Mr. Kellam:

This letter is to inform you that the Department of Natural Resources has information which indicates that Oconto Falls Tissue, Inc. may not be in compliance with Air Operation Permit # 443044470-P01 (Permit) and Wisconsin's air pollution control rules at its tissue mill located in Oconto Falls, Oconto County, Wisconsin. Results of the inspection conducted on November 2, 2005 indicate that the Mill is in noncompliance, as follows:

1. Failure to submit semiannual reports in September 2004 and September 2005, in violation of Permit Condition I.H.4.b.(1).
2. Failure to submit annual report outlining facility's investigation of technologies to reduce chloroform emissions on the Broke Pulper (P01/S01), in violation of Permit Condition I.A.1.c.(4).
3. Failure to keep records of filter checks and replacements for Tissue Machine #1, in violation of Permit Condition I.D.1.c.(4).
4. Failure to change or inspect Tissue Machine #2 filters on a weekly basis, in violation Permit Condition I.D.1.b.(3).
5. Insufficient records to indicate that all stack filters (1 – 5) on Tissue Machine #2 are being changed or inspected on a weekly basis, in violation of Permit Condition I.D.1.c.(4).
6. Failure to report chloroform emissions in the air emissions inventory for calendar years 2003 and 2004, in violation of Wisconsin Administrative Code NR 438.03(1)(a).

By January 16, 2006, please submit to the Department a letter which outlines Oconto Falls Tissue, Inc.'s plan to resolve the violations noted in #1 - #6 above and its efforts to return to compliance. Your letter can be submitted to me in the Green Bay office.

Please be advised that the Department is authorized to seek injunctive or other appropriate relief for noncompliance with air pollution laws, including forfeitures of no more than \$25,000 per day of

**Oconto
Falls
Tissue
Inc.**



100% RECYCLED PAPER

Corporate Address
P.O. Box 28316
Green Bay, WI 54324-0316
Telephone: 920-983-8379
Fax: 920-347-2228

Mill Address
106 East Central Avenue
Oconto Falls, WI 54154
Telephone: 920-846-3411
Fax: 920-846-4410

January 16, 2006

Michelle Farley
Air Management Engineer
Wisconsin Department of Natural Resources
Northeast Region Headquarters
2984 Shawano Avenue
PO Box 10448
Green Bay, WI 54307-0448

Re: Response to Letter of Noncompliance

Dear Michelle:

Please accept this letter as our response to the Letter of Noncompliance dated on January 3, 2006. The responses are listed in order that they appeared in the January 3rd letter.

1. The semiannual reports were not filed in September 2004 and September 2005 as I mistakenly thought that the annual compliance certification letter was the only report I needed to submit. From this point forward I will be submitting a report by March 1 for the previous July 1 through December 31 and September 1 for the previous January 1 through June 30th.
2. Our permit requires that our chloroform emissions out of the broker pulper be less than 10.4 pounds per day. In 2004 our chloroform emissions ranged from 0.11 to 0.60 pounds per day. In 2005 our chloroform emissions ranged from 0.16 to 0.56 pounds per day. I felt that as a result of our low emissions a separate letter was not needed. From this point forward I will submit the letter at the same time I submit the annual compliance certification.
3. The filter checks on TM1 are now being performed on a weekly basis. The revised format that we developed is being used.
4. The filter checks on TM2 are now being performed on a weekly basis. The revised format that we developed is being used.
5. The filter checks on TM2 are now being performed on a weekly basis. The revised format that we developed is being used.
6. I understand from our conversation last week that a change in Department regulations may have triggered a change to the inventory reporting format. We will work with URS to make sure that we watch for this prior to the next submittal.

Michelle, I can assure you that the six items listed above have either been fixed or will be fixed shortly. If you have any additional questions or comments, please call me at 920-983-8379.

Sincerely,

Jim Kellam
Environmental Coordinator

1. The first part of the document is a letter from the [redacted] to the [redacted] dated [redacted]. The letter discusses the [redacted] and the [redacted] of the [redacted].

2. The second part of the document is a letter from the [redacted] to the [redacted] dated [redacted]. The letter discusses the [redacted] and the [redacted] of the [redacted].

March 27, 2006

Wisconsin Department of Natural Resources
Mr. Bruce Oman, Basin Engineer
101 Ogden Rd.
Peshtigo, WI 54157

Re: Integrity Verification of Proposed Mini System Aeration Basin

Dear Mr. Oman,

During our meeting on March 23, 2006 Oconto Falls Tissue provided a summary of events that chronicled the disappointing performance and subsequent efforts to improve the wastewater treatment processes at the Oconto Falls facility. As a result of the above-mentioned meeting, the Department requested a written summary of the steps taken to insure the integrity of the unused stock storage tank prior to it being utilized as an aeration basin. Please accept this letter as a response to the Departments request.

Upon determining that the existing aeration basins were in need of timely replacement, potential replacement options were discussed. It was discovered that the unused stock storage tank was available. The following items were verified to confirm both the suitability and integrity of the tank.

- The tank was measured to insure that adequate volume was present. It was determined that the proposed tank increased the aeration volume.
- Equipment suppliers, EPI and Quality Sand Blasting, were brought in to confirm the suitability of the tank and to size aeration equipment. It was determined that the tank was suitable.
- The tank was thoroughly cleaned and inspected for obvious integrity issues. The inspection revealed only minor surface cracking of the concrete, which was repaired. It was also revealed that the steel support structure along with a steel inspection hatch mounted in the north wall showed signs of corrosion. A contractor, Quality Sand Blasting, was hired to sandblast the entire surface and apply new coating systems.
- The tank was filled with water to confirm that the tanks integrity was intact. The tank level remained constant for a 48-hour period before it was dewatered to allow for the installation of the aeration equipment.
- After the installation of the equipment the aeration, the tank was again filled with water to conduct equipment performance testing. After performance testing the tank remained full for another 48-hour period while maintaining a constant level before the aeration basin was put into service.
- The aeration basin provided an immediate improvement to the efficiency of the Mini System and appears to have had no problems since it was put into service.

Please accept our thanks in advance for your support regarding this matter and we look forward to working with the Department as we resolve the issues before us. If there are any questions in regard to this matter or any other wastewater issue please feel free to give me a call at my office.

Sincerely,

Tod K. Maurina

Enc.

24

Mercury Reduction Plan for the Oconto Falls Tissue, Inc.

Background

Mercury is a naturally occurring substance that can cause serious health and ecological problems when released to the environment through human activities. Mercury is a nerve toxin that may impair sight, hearing and the ability to walk or talk. Atmospheric mercury mixes with rain and snow and falls into lakes and waterways. When mercury is deposited in lakes or waterways, bacteria convert it to methyl mercury. Methyl mercury contaminates the food chain and builds up in the tissue of fish and of wildlife and humans who eat the fish. Because of high mercury concentrations in the fish, several Great Lakes states issue advisories each year cautioning people to limit how much fish they eat.

About two-thirds of the mercury in the atmosphere comes from man-made sources. About a gram of mercury enters a 20-acre lake each year. A gram of mercury is only a drop. A teaspoon of mercury weighs about 70 grams. A thermostat contains about 3 grams of mercury, a fluorescent lamp contains 4 grams and a mercury switch contains 3.5 grams of mercury.

Even these small amounts of mercury in a lake can contaminate the fish, making them unfit to eat on a regular basis. Minimizing mercury releases is important. If we want to continue eating the fish we catch and seeing the fish-eating wildlife (loons, eagles and osprey), we need to protect our environment from release of mercury. In cooperation with the State of Wisconsin, the EPA and local governments the Oconto Falls Tissue, Inc. is committed to help reduce mercury in the environment.

The Mercury Reduction Plan for the Oconto Falls Tissue, Inc. will address the following:

- Goals of the Oconto Falls Tissue, Inc.
- Identification of possible mercury sources at the facility
- Action Plan for implementation of the Mercury Reduction Plan
- Past mercury reduction efforts.

Goals of the Oconto Falls Tissue, Inc. Mercury Reduction Plan

- Compliance with the WPDES Permit # WI-0000531
- Reduction of mercury emissions entering the WWTP and the environment through identification and elimination of mercury sources within the mill.

Identification of Possible Mercury Sources within this Facility

1. Thermometers
2. Fluorescent Light Bulbs
3. Barometers
4. Manometers
5. Pesticides/fungicides/slimicide
6. Bulk liquid mercury
7. Relays & Switches
8. UV Disinfection
9. Paint & Glue
10. Pigments for colored papers
11. Mercury contaminated raw materials
12. Mercury contaminated process chemicals

Action plan for Implementation

Staff: Mike Markell – Purchasing
Paul Halverson – Maintenance
Brandon Kaufman – Wastewater, MCO

Action Plan

1. Assemble a pollution prevention team to identify the sources of mercury at this facility.
2. Identify and develop a list of alternative products.

6. Implement a chemical management program that includes pre-purchase review and approval by environmental/mercury reduction staff.
7. Require that all engineering projects be reviewed by environmental impacts specific to mercury or other chemicals of concern.
8. Practice the basis of pollution prevention: (a) know where mercury is found: (b) use mercury-free alternatives: (c) properly recover and recycle elemental mercury and mercury containing product.
9. Evaluate program effectiveness.

Past Mercury Reduction Efforts

- OFTI personnel surveyed the entire plant to find devices that contained mercury. The survey revealed that there are mercury switches and mercury containing thermostats onsite. Both the switches and thermostats have been labeled "This unit contains mercury." Switches will be replaced with non-mercury switches when applicable as they go bad.
- In February 2000, mercury from storage and out-of-service switches were sent to Brown County Hazardous Waste Facility in Green Bay.
- OFTI has a spill plan in place for a mercury spill.
- Whenever a mercury containing device is removed a spill kit will be at the job site.
- OFTI will continue to use a licensed waste disposal firm to properly dispose of the mercury devices that are taken out of service. Storage of mercury will be in a Plastic pail that is appropriately labeled.

ANALYTICAL REPORT

NORTHERN LAKE SERVICE, INC.
Analytical Laboratory and Environmental Services
400 North Lake Avenue - Crandon, WI 54520
Ph: (715)-478-2777 Fax: (715)-478-3060

Client: Oconto Falls Tissue Inc
Attn: Brandon Kaufman, Earth Tech
106 East Central Avenue
Oconto Falls, WI 54154 1412

Project: Wastewater

WDNR Laboratory ID No. 721026460
WDATCP Laboratory Certification No. 105-330
EPA Laboratory ID No. W100034

Printed: 01/15/07 Code: S Page 1 of 1

NLS Project: 104284

NLS Customer: 87169

Fax: 920 983 8387 Phone: 920 983 8379

Field Blank NLS ID: 429225
Ref. Line 1 COC 92039 Field Blank Matrix: FB
Collected: 01/09/07 07:30 Received: 01/10/07
Parameter
Mercury, Ultra Low Level

Result	Units	Dilution	LOD	LOQ	Analyzed	Method	Lab
0.13	ng/L	1	0.13	0.45	01/12/07	SW846 1631E	721026460

Method Blank 1 = 0.13 ng/L, Method Blank 2 = <0.13 ng/L, Method Blank 3 = 0.20 ng/L
OPR 1 = 106 %, OPR 2 = 99 %

001 Eff. Grab NLS ID: 429226
Ref. Line 2 COC 92039 001 Eff. Grab Matrix: WW
Collected: 01/09/07 07:30 Received: 01/10/07
Parameter
Mercury, Ultra Low Level

Result	Units	Dilution	LOD	LOQ	Analyzed	Method	Lab
19	ng/L	1	0.13	0.45	01/12/07	EPA 1631E	721026460

Method Blank 1 = 0.13 ng/L, Method Blank 2 = <0.13 ng/L, Method Blank 3 = 0.20 ng/L
OPR 1 = 106 %, OPR 2 = 99 %

Inf. Grab NLS ID: 429227
Ref. Line 3 COC 92039 Inf. Grab Matrix: WW
Collected: 01/09/07 09:00 Received: 01/10/07
Parameter
Mercury, Ultra Low Level

Result	Units	Dilution	LOD	LOQ	Analyzed	Method	Lab
3.2	ng/L	1	0.13	0.45	01/12/07	EPA 1631E	721026460

Method Blank 1 = 0.13 ng/L, Method Blank 2 = <0.13 ng/L, Method Blank 3 = 0.20 ng/L
OPR 1 = 106 %, OPR 2 = 99 %

001 Eff. Comp NLS ID: 429228
Ref. Line 6 COC 92039 001 Eff. Comp Matrix: WW
Collected: 01/09/07 07:30 Received: 01/10/07
Parameter
Phosphorus, tot. as P

Result	Units	Dilution	LOD	LOQ	Analyzed	Method	Lab
0.35	mg/L	2	0.014*		01/12/07	EPA 365.2	721026460

Values in brackets represent results greater than or equal to the LOD but less than the LOQ and are within a region of "Less-Certain Quantitation". Results greater than or equal to the LOQ are considered to be in the region of "Certain Quantitation". LOD and/or LOQ tagged with an asterisk (*) are considered Reporting Limits. All LOD/LOQs adjusted to reflect dilution.

LOD = Limit of Detection LOQ = Limit of Quantitation ND = Not Detected (< LOD)
DWB = Dry Weight Basis NA = Not Applicable %DWB = (mg/kg DWB) / 10000
MCL = Maximum Contaminant Levels for Drinking Water Samples. Shaded results indicate >MCL.

Reviewed by:  R. T. Krueger
President

040040

Oconto Falls Tissue, Inc.

Memo

To: Steve, Dan

From: Jim Kellam

CC:

Date: 5/2/2006

Re: Follow-up Information on OFTI Wastewater permit review with DNR

TO:
✓ RASAN
✓ Mark Porter 5/2/06
✓ Ron
SK

RMT sent me their notes from the 4/6 meeting with the DNR. They also provided us a summary of how they suggest we proceed applying for the increase.

[REDACTED]

omom

10/10/21

10/10/21

10/10/21

10/10/21

RMT, INC.

744 HEARTLAND TRAIL P.O. BOX 8923 MADISON, WI 53708-8923 PHONE (608) 831-4444

MEETING NOTES

Project Name: Oconto Falls Tissue, Inc.
Project No.: 7239.01

Meeting Date: 6 April 2006
Meeting Place: OFTI office, Green Bay, Wisconsin
Meeting Purpose: Discuss OFTI's operational status, plans for growth, and coordination of WPDES permit modification process

Participants:

Dan Platkowski – OFTI	Jeff Haack – WDNR-Madison
Jim Rottier – OFTI	Bruce Oman – WDNR-Peshtigo
Jim Kellam – OFTI	Dave Hantz – WDNR-Madison
Todd Maurina – OFTI	Eric Gredell - RMT
	George Thompson - RMT

Topics Discussed:

D. Platkowski provided opening remarks:

- The mill currently operates two paper machines. The current average paper production output is 160 TPD; the maximum day production record is 248 TPD.
- Fiber for the paper machines has historically been obtained from 4 sources:
 - Waste paper, processed on-site in the deink plant
 - Purchased pulp
 - Purchased wet-lap pulp
 - Purchased dry recycled pulp
- OFTI's current customer requires paper made from 100% waste paper, processed through the on-site deink plant.
- Waste paper quality has been deteriorating, with respect to the amount of tramp contaminants such as glues, coatings, etc., as well as a greater variety of waste paper types. These changes in waste paper quality have resulted in significant increases in soluble BOD loading on the mill's wastewater treatment plant (WWTP).
- The current WPDES permit includes effluent BOD limits based on 80 TPD deink production. OFTI would like to operate at the full existing deink plant production capacity of 175 TPD, recognizing that deink production at 175 TPD would increase the BOD and solids loading on the WWTP. OFTI believes the mill is eligible for increased effluent limits in accordance with the categorical discharge standards.

WWTP Performance

D. Hantz distributed a table (attached) containing monthly average effluent quality data for 1999, for 28 paper mills in Wisconsin. He noted that OFTI's effluent quality, on a concentration basis, is the poorest of all 28 mills. He also distributed two graphs (attached) which show that the variability and level of OFTI's effluent BOD concentration and mass discharge rate has increased noticeably since late 2004/early 2005, which resulted in several effluent limit violations in 2005. He noted that OFTI's effluent BOD averaged 79 mg/L in 1999, and is typically in the range of 200 mg/L recently, which "is very high compared with all other

Wisconsin mills." He added that, "putting the regulations aside, it doesn't make environmental common sense to give OFTI higher limits when the WWTP is performing so badly."

The comments by D. Hantz led to a discussion of the question: "What would WDNR consider to be 'reasonably good' effluent quality from OFTI's WWTP?" J. Haack (WDNR's primary calculator of surface water quality requirements for OFTI's region) said WDNR would expect OFTI to produce effluent comparable to the quality typically produced by conventional municipal wastewater treatment systems, i.e., monthly average concentrations of 30 mg/L BOD₅ and 45 mg/L TSS. D. Hantz said USEPA's Development Document for the Pulp and Paper category uses 52 mg/L BOD₅ as the industry "model" or benchmark that was used by USEPA to calculate the mass-based discharge limits for OFTI's industrial subcategory. D. Platkowski noted that such general comparisons may not be entirely appropriate, since many paper mills in the state have shut down paper making capacity, or changed operations in other ways, that have reduced the contaminant loading on their WWTP, thus allowing more efficient treatment performance. In contrast, OFTI is in a production expansion mode, which with the deteriorating waste paper quality and other factors, is increasing the difficulty in achieving consistent compliance with the current restricted effluent limits.

D. Hantz and J. Haack concurred that it would be necessary for OFTI to demonstrate full permit compliance for at least 4 consecutive months to show that the WWTP is currently being operated as effectively as possible.

Permit Modification Requirements and Factors

D. Hantz distributed a single page of notes (attached) titled "Notes on Potential Permit Modification Process for Production Increases."

D. Hantz said that other dischargers that are in a similar situation as OFTI, i.e., that have an overloaded WWTP but may otherwise be eligible for increased effluent limits, typically submit proposed plans for a WWTP expansion to WDNR at the same time they apply for a permit revision for increased limits, since improvements are often required before WDNR will allow increased WWTP loading and approve higher effluent limits.

There are two optional approaches for modifying the effluent limits. One procedure is a full "revoke-and-reissue" of the current permit; the other is a revision of the current permit. For either approach, new sampling data for the final effluent would be required to support the application. The effluent must be sampled under conditions representative of sustained deink plant operation of 175 TPD. J. Haack stated his personal preference that the revoke-and-reissue approach should be used, rather than a revision of the current permit. However, the revoke-and-reissue approach would open the permit to public review and comment, which may attract the attention of environmental protection groups. The permit application form that must be submitted would be similar to the application provided by OFTI for the last permit revision.

D. Hantz said the permit application submitted by OFTI must include calculations of the expected allowable discharge limits, with justification and explanations for all calculations. Documentation supporting the mill production rates used to calculate the limits must be provided. WDNR will consider any "new" production, above current production rates, to be subject to the New Source Performance Standards (NSPS); the Best Practicable Technology (BPT) limits would be used for the "existing" production component. It is also necessary to define and justify the estimated date when the full, continuous production capacity of 175 TPD would begin. OFTI should currently be eligible for discharge limits, under the current permit, based only on the actual annual average off-machine tonnage, if the mill has not consistently operated at a deink production rate at or near 80 TPD. He said WDNR may consider any increased deink production above 80 TPD, as stated in the current permit, to be a "new source" under the regulations. However, it is also possible that WDNR may use the most recent 12-month average production to define "existing" production, and consider all increases in the production rate above that value as a new source, subject to NSPS in a revised or reissued permit. He said the deink discharge

allowance includes both deink pulp and paper production, under the integrated mill subcategory. However, he said OFTI can propose an alternative approach for calculating the allowable increased effluent limits, if OFTI believes it can be justified. He said NSPS would be applied to the production contributed by the last paper machine that was installed.

The requirement to demonstrate that the WWTP is being operated as efficiently as possible "is a big hurdle right now," according to J. Haack. WDNR understands that questions regarding the rated treatment capacity of the WWTP, and the cause(s) of the historically poor treatment performance, are expected to be addressed in the engineering study being prepared by McMahon Engineering.

D. Hantz noted it is also necessary to evaluate whether any environmental media other than surface water quality (e.g., air, solid/hazardous waste, groundwater, etc.) would be affected by changes in WWTP operation under the future increased wastewater loading conditions.

D. Hantz said the easiest procedure for obtaining WDNR's approval of the increased deink plant production requested by OFTI would be to: demonstrate continuous acceptable performance of the WWTP; show that there would be no river water quality problems due to the increased loading on the WWTP; and provide calculations of WWTP capacity showing that no problems would be expected in maintaining future effluent limit compliance with the increased WWTP loading. If these factors can be demonstrated and provided to WDNR in a formal "notice," WDNR could relatively easily approve the proposed production increase. However, he noted that the change to 100% on-site deink pulp production is "new production" under the regulations, and WDNR would apply NSPS to the portion of the increased limits associated with this new production. D. Hantz will forward the latest WDNR guidance documents and instructions regarding preparation and submittal of WPDES permit applications to E. Gredell.

Submittal of a NR 207 Antidegradation Worksheet will be required.

Mercury

D. Hantz said he expects that a reissue or revision of OFTI's permit would be "reviewed under a microscope by environmental groups," based on WDNR's recent experience with permits for other facilities. He said mercury in industrial discharges has received particular scrutiny by these groups. He is aware that a Pollutant Minimization Program for mercury is currently being implemented at OFTI. WDNR may be able to accelerate a determination on the need for a numerical effluent limit for mercury, if necessary to facilitate a permit modification request from OFTI in the near future.

J. Haack said in cases where a numerical limit for mercury is required, it is typically set at 0.0013 ng/L Hg, which is the wildlife-derived risk value for Great Lakes water sources. However, WDNR typically provides a variance for this limit, with an Alternate Concentration Limit (ACL) established by WDNR. The ACL is often set at background concentration if a discharger's sole source of process water supply is from the surface water that also receives the discharge. If a discharger's process water source is the municipal potable water supply, the ACL will be calculated as a percentage of the average mercury in the city water, per state regulations. He said WDNR prefers to have a completed PMP in-hand before issuing a variance and ACL for mercury for a specific permit. He also said it is necessary for OFTI to provide 24 months of effluent monitoring data for mercury to WDNR (for the period July 2004 through June 2006), before WDNR would be ready to act on the potential need for a numerical effluent limit for mercury.

J. Rottier said > 99% of the mill's water supply comes from the river; the balance is from the city supply. He will send records of the mill's river water and city water usage to J. Haack, for his use in making a preliminary determination regarding the need for a mercury limit and a potential ACL. J. Rottier noted that a mercury inventory for the entire mill was completed in approximately 1996, and a mercury abatement plan has already been implemented. It was suggested that OFTI should continue checking potential off-site sources of mercury that could enter the wastewater discharge, such as purchased chemicals (caustic soda, sulfuric acid, etc.).

D. Hantz suggested that OFTI should closely review and assess the mercury data from the regular

monthly compliance monitoring, and evaluate whether conditions that would trigger the need for a mercury limit are likely to occur.

Antidegradation/Antibacksliding

J. Haack said it is currently uncertain whether the Oconto River would have the necessary assimilative capacity to accept the increased contaminant mass loading that would result from increased discharge limits for the OFTI mill. He said previous modeling of the Oconto River's assimilative capacity near Oconto Falls was last done by WDNR when Scott Tissue was operating the mill. A simple model called "the 26-pound method" is suitable for most situations. This model allows 26 lb. BOD₅ per cfs river flow, at the 7-day, 10-year low flow conditions, with adjustments for other water quality factors such as temperature. J. Haack said that using the 26-pound method, the Oconto River is already allocated to its maximum capacity for BOD. WDNR takes into account the full permitted loading of all discharges to the river in calculating the potential cumulative loading, to evaluate requested increased loadings.

Determining whether OFTI would be eligible for increased permit limits based on estimated impact on the river "would be a tough question for WDNR," per J. Haack. It may be necessary to perform more rigorous modeling of the river to determine whether the projected increased discharge from OFTI could be accommodated. It would have to be shown that the increased loading from OFTI would not cause the cumulative contaminant loading from all dischargers to exceed 1/3 of the remaining assimilative capacity of the river. WDNR's modeling section personnel in Madison (Greg Hill; Jeff Kreiter (sp. ?); Steve Jaeger) should be contacted with questions about the need for and details of additional river modeling to support a future permit application from OFTI. The type of modeling performed by WDNR's Madison personnel typically requires 6 months to 1 year, and potentially longer, to complete. This is partly due to the nature of the modeling, and partly due to the current high work load at WDNR.

D. Hantz noted that the reason these potential difficulties regarding antidegradation were not encountered during the last permit revision cycle was because increases in discharge limits were not requested.

Notes prepared by:
Eric Gredell
RMT Inc.
Madison, WI

REC'D FROM
DAVE HANTZ - WDMR
MEETING @ OFT
4-6-06

Notes on Potential Permit Modification Process for Production Increases

- Notify per the planned changes permit condition

Planned Changes

In accordance with ss. 283.31(4)(b) and 283.59, Stats., the permittee shall report to the Department any facility expansion, production increase or process modifications which will result in new, different or increased discharges of pollutants. The report shall either be a new permit application, or if the new discharge will not violate the effluent limitations of this permit, a written notice of the new, different or increased discharge. The notice shall contain a description of the new activities, an estimate of the new, different or increased discharge of pollutants and a description of the effect of the new or increased discharge on existing waste treatment facilities. Following receipt of this report, the Department may modify this permit to specify and limit any pollutants not previously regulated in the permit.

- Complete Permit application - projections of effluent quality for all pollutants to be discharged and WBT and basis for projections (on Form 2C equivalent or maybe form 2D for new sources if expansion... extensive testing of effluent if increased production already occurred)
- Engineering report on capability of treatment system to treat increased pollutants and plans for any expanded or improved ww treatment needed by P.E.
- Production figures (daily off machine moisture content for 12 month period if existing production) and calculations and justification of categorical limits
- Antidegradation Demonstration under NR 207 Wis. Adm. Code
- Environmental Assessment Process (EA form, endangered resources identification and decision on EIS)
- Address Any wetlands affected under NR 103 Wis. Adm. Code

Initial Preliminary Factors

- An evaluation by the Department of available BOD assimilative capacity in the Oconto River to assure any proposed increases in loadings would meet water quality standards.
- No discharge of toxic pollutants at levels of concern (Hg, dioxin, PCBs, other toxics...) or water quality antidegradation issues or other unforeseen environmental impact issues.
- Concurrent review and approval of finalized plans for expanding or improving the wastewater treatment facility
- Concurrent issuance of appropriate WPDES stormwater permits
- Positive public support for the proposed expansion project
- Obtaining all other applicable DNR, local and federal permits
- Other

Permit Process

- Determine limits, Draft Permit, PN, Public & BPA Comments, Potential Hearings, Potential Challenges, Timeframes

REC'D FROM
DAVE WANTS-WONK
MEETING @ OFT
4-6-06

Potential Categorical Limits Calculations for the 200 tons/day Tissue Machine (using purchased pulp) installed in 1998 for reference only (since a need for increased limits has not been demonstrated)

<u>Parameter</u>	<u>Production Basis¹</u> <u>(Tons/Day)</u>	<u>Conversion Factor²</u> <u>(Lbs/Ton)</u>	<u>Effluent</u> <u>Limitations</u> <u>(Lbs/Day)</u>
BOD ₅ - 30 Day Avg.	1998 New Source Expansion - 200	6.8	1360
BOD ₅ - Daily Max.	1998 New Source Expansion - 200	14	2800
TSS - 30 Day Avg.	1998 New Source Expansion - 200	5.2	1040
TSS - Daily Max.	1998 New Source Expansion - 200	12	2400

1. The production basis for 200 T/D subject to NSPS was documented as part of a production expansion including a new paper machine in 1998. The permit reissuance applications received in 2002 reported similar production levels.

2. Effluent limitations are specified in NR 284, Wis. Adm. Code and 40 CFR-Part 430-Subpart (Nonintegrated Tissue Paper).

REC'D FROM
DAVE HANKE - WOLF
MERTENS & OFT
4-6-06

TABLE A - Categorical Effluent Limitation Calculations - Outfalls 001

Oconto Falls Tissue Mills (WI-0000531-7)

Categorical Limits Calculations (2004 Permit Reissuance - identical to the previous permit)

<u>Parameter</u>	<u>Production Basis¹</u> <u>(Tons/Day)</u>	<u>Conversion Factor²</u> <u>(Lbs/Ton)</u>	<u>Effluent</u> <u>Limitations</u> <u>(Lbs/Day)</u>
BOD ₅ - 30 Day Avg.	Existing - 80	18.8	1504
BOD ₅ - Daily Max.	Existing - 80	36.2	2896
TSS - 30 Day Avg.	Existing - 70	25.9	1813
TSS - Daily Max.	Existing - 70	48.1	3367

1. The existing production basis of 80 T/D for BOD₅ and 70 T/D for TSS subject to BPT limits was documented during the previous permit reissuance and confirmed as dedicated production in the current permit reissuance application information.
2. Effluent limitations are specified in NR 204.12(1)(a) (Table 1 Subcategory #20 - Deink) and 40 CFR-Part 430-Subpart Q (Deinking Subcategory - Tissue Paper).

New Source Performance Standards are Lower than Existing Source Standards

<u>Parameter</u>	<u>Conversion Factor²</u> <u>(Lbs/Ton)</u>
BOD ₅ - 30 Day Avg.	10.4
BOD ₅ - Daily Max.	19.2
TSS - 30 Day Avg.	13.6
TSS - Daily Max.	26.2

1999 Discharge Monitoring Report Data

Rec'd FROM
DAVE HANZ- ONRfor Reference only
(data not
personally verified)

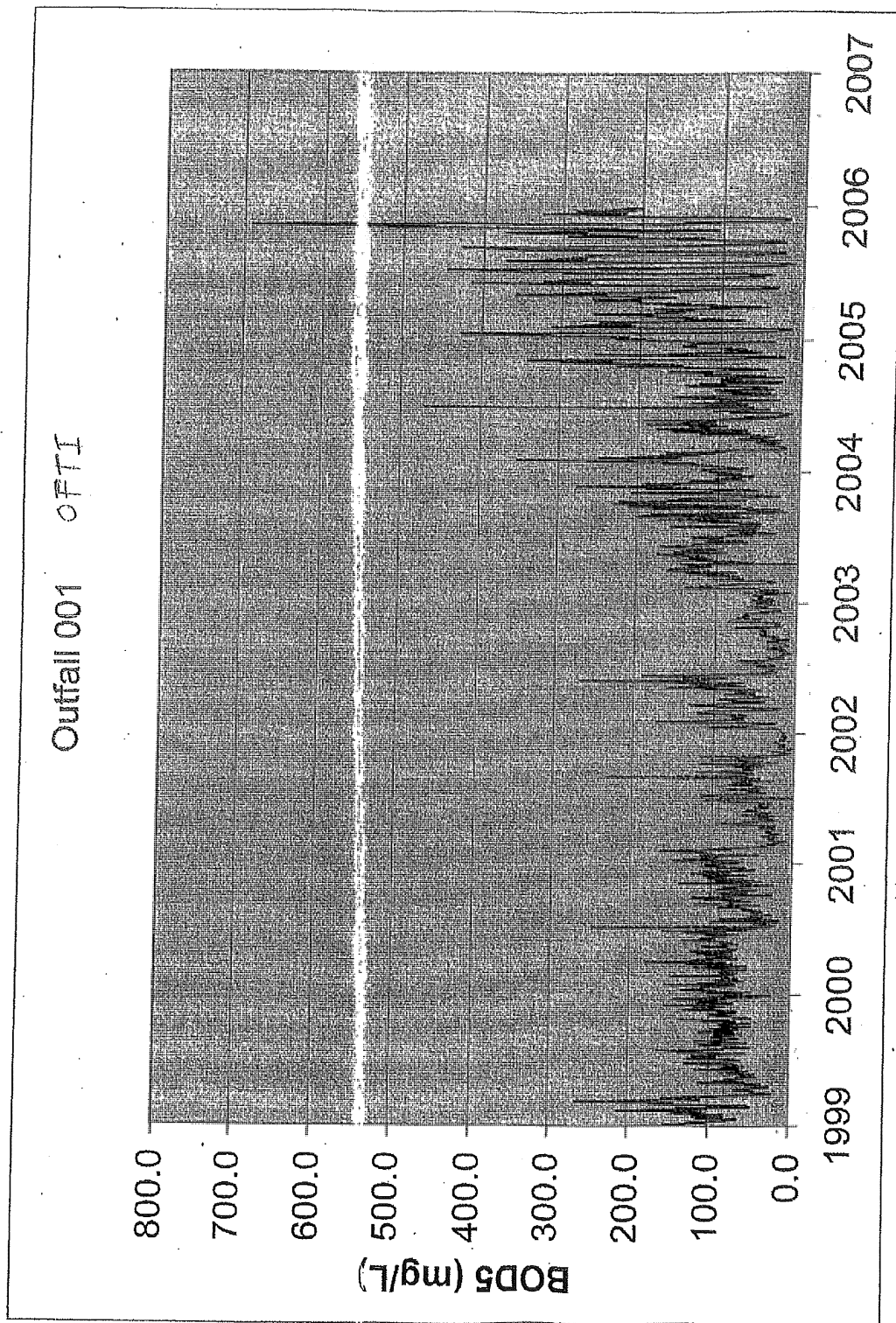
Permit No.	Permittee	LTA Flow			BOD5			TSS			LTA Phosphorus		
		(MGD)	% of		LTA (mg/L)	CV	n	LTA (mg/L)	CV	n	LTA (mg/L)	CV	n
			Average	Limit									
0001341	Little Rapids Corp., Shawano	1.93	3		2.8	0.54	365	3.3	0.85	365	0.20		52
0000698	Consolidated Papers, Inc., Interlake	11.85	4		2.8	0.75	271	6.1	0.53	270	0.68		78
0001848	Fort James Corp. - West	6.83	2		4.6	0.49	365	9.0	0.59	365	0.72		365
0037842	Kimberly-Clark, Neenah	2.35	7		5.1	0.84	365	9.7	0.70	365	0.44		24
0003468	Consolidated Papers, Inc., WRC	5.88	9		5.6	0.51	273	9.4	0.81	273	0.57		8
0000752	Consolidated Papers, Inc., Niagara	5.93	6		5.8	0.64	333	7.1	0.90	334	0.89		334
0001121	P.H. Glatfelter Co.	4.07	5		7.6	0.59	304	10.1	0.70	304	1.09		273
0003611	Kimberly-Clark, Whiting	2.69	6		7.9	1.02	303	6.4	0.96	303	0.35		41
0037389	Georgia-Pacific Corp., Menasha	2.62	5		7.9	0.59	365	12.7	0.62	365	0.48		53
0000825	International Paper Co., Kaukauna	19.84	24		10.2	0.39	301	19.8	0.50	301	0.52		44
0003026	Wausau-Mosinee Paper Corp., Rhinelander	10.42	28		10.8	0.43	363	6.2	0.67	363	0.52		102
0003379	Wausau-Mosinee Paper Corp., Brokaw	12.54	19		12.1	0.63	334	20.1	0.78	334	1.12		115
0000990	Appleton Papers, Inc.	9.81	21		13.0	0.51	365	13.2	0.57	365	0.57		365
0037991	Consolidated Papers, Inc., WQC	33.34	22		14.0	0.51	273	15.5	0.73	273	0.27		10
0003204	City Forest Corp.	1.43	17		14.1	0.67	360	15.1	0.63	361	0.79		49
0000540	Kimberly-Clark, Marinette	1.84	8		18.5	0.46	301	13.7	0.74	303	0.04		1
0001031	Procter and Gamble Paper	2.56	12		18.8	0.34	361	30.3	0.80	363	-		-
0003671	Wausau-Mosinee Paper Corp., Mosinee	12.67	62		19.6	0.57	334	22.6	0.41	334	0.24		21
0003620	Georgia-Pacific Corp., Nekeosa	30.86	33		20.0	0.35	365	28.7	0.51	365	0.94		56
0003212	Fraser Papers, Inc.	5.46	20		23.0	0.38	357	25.3	0.56	361	1.12		49
0000680	American Tissue Mills, Neenah	2.01	15		24.9	0.48	365	5.5	0.44	365	-		-
0003077	Plainwell Tissue	2.95	27		29.6	0.50	365	28.5	0.74	365	0.58		135
0002810	Packaging Corp. of America	5.03	15		33.5	0.40	334	53.9	0.39	334	3.65		48
0000973	Green Bay Packaging, Inc.	1.23	14		35.8	0.59	365	26.2	0.63	365	-		-
0026042	Weyerhaeuser Co.	6.56	23		37.9	0.53	365	66.7	0.56	365	1.69		365
0001473	International Paper Co., De Pere*	2.21	25		43.8	0.45	322	12.7	0.47	322	0.18		46
0001261	Fort James Corp. - East	8.82	51		44.3	0.38	365	6.9	0.42	365	0.09		12
0000531	Oconto Falls Tissue	1.48	65		78.8	0.37	274	44.0	0.43	274	0.35		8
0000591	Kerwin Paper	0.00	-		-	-	-	-	-	-	-		-

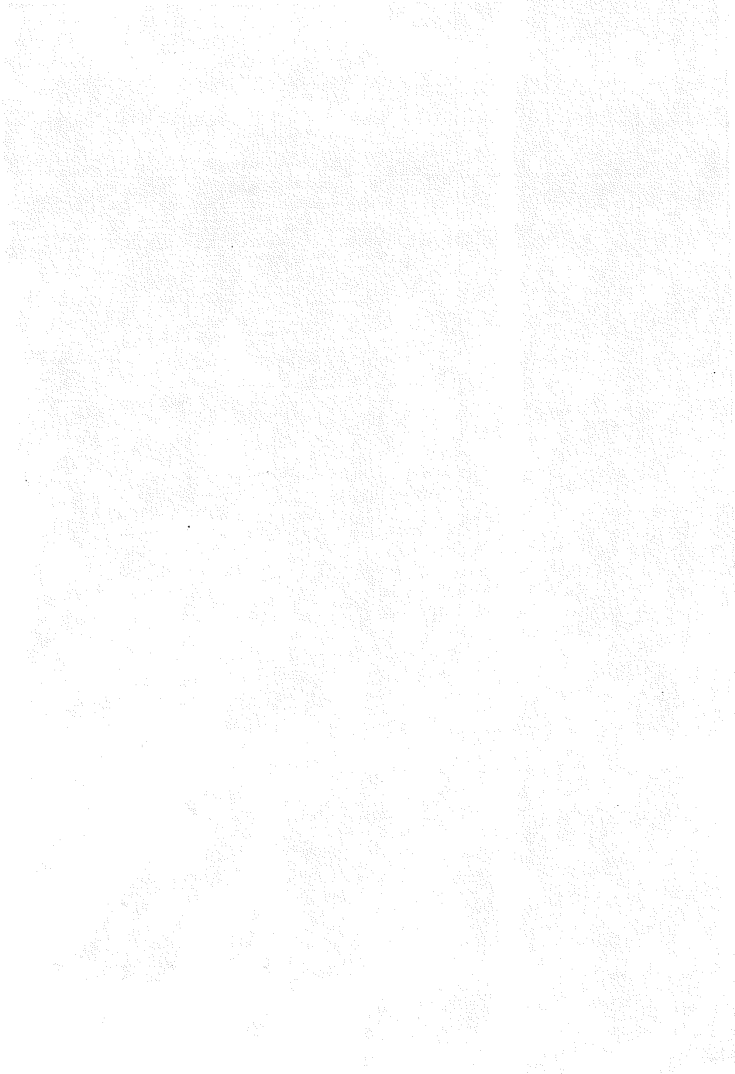
LTA = Long-term average: the average of daily values. *OFPI 2005-2006 (199 mg/L BOD5) (1497 L/d BOD5)

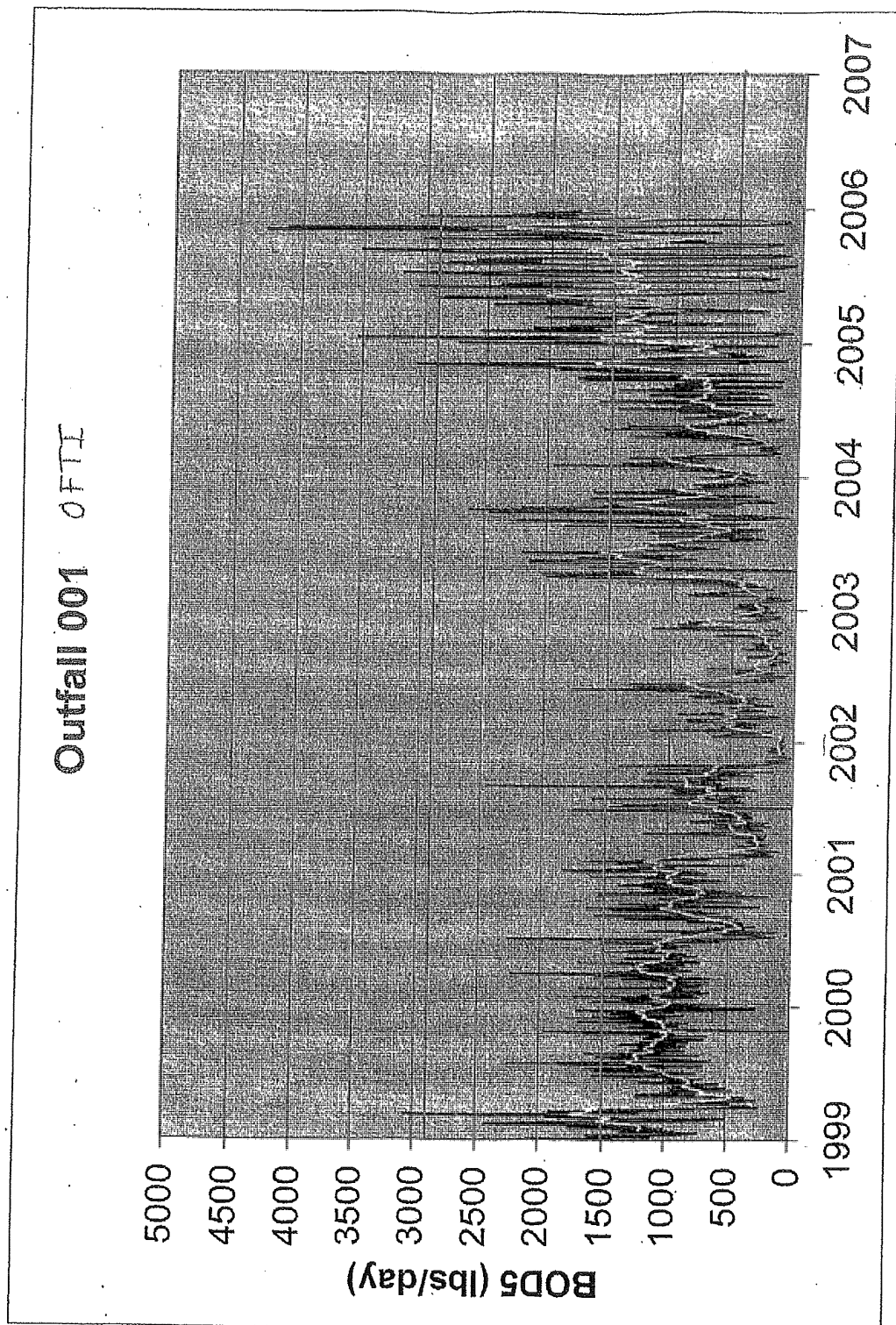
CV = coefficient of variation: the ratio of the standard deviation to the mean assuming a lognormal distribution.

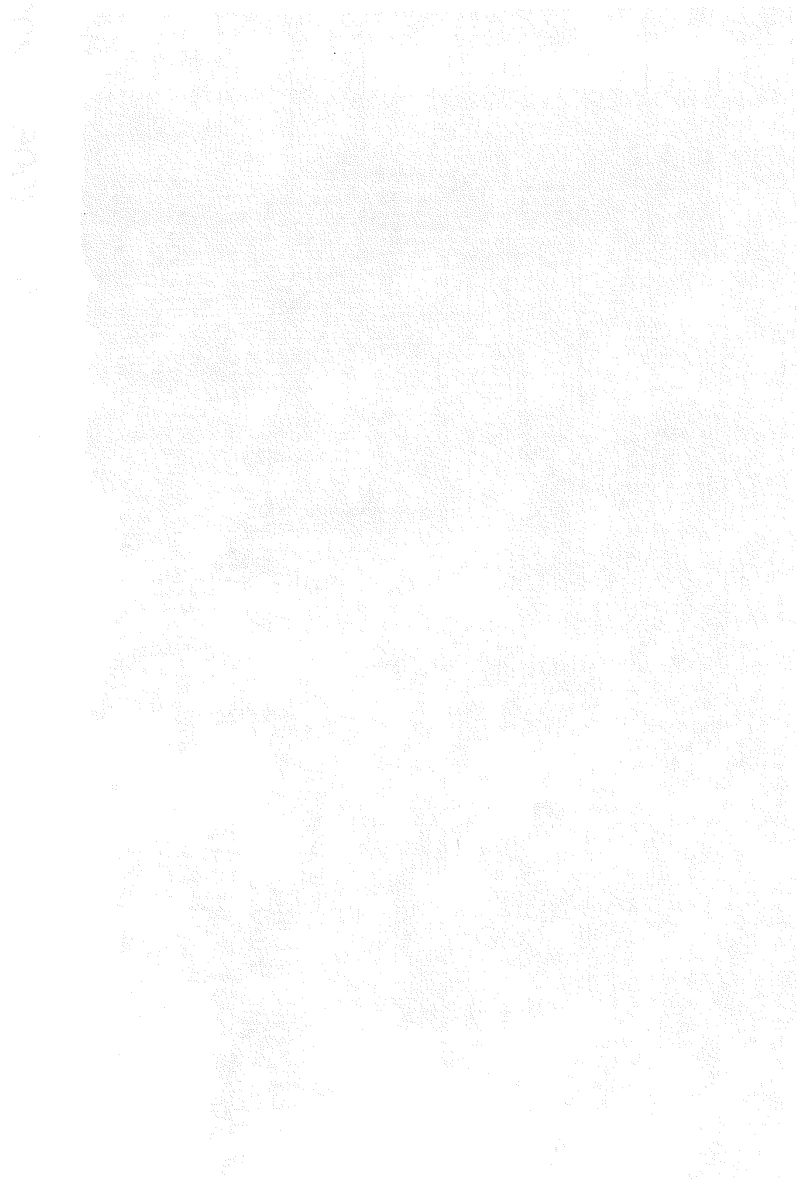
n = number of daily values included in the long-term average. Note: not all monthly discharge monitoring reports were available for this table.

*Long-term average of variable limit used excluding limits of zero on days with no direct discharge.











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www.rmtinc.com

28 April 2006

Mr. Jim Kellam
Partners Concepts Development Inc.
1555 Glory Road
Green Bay, WI 54304

Re: Oconto Falls Tissue, Inc. (OFTI)
WPDES Permit Modification Process

Dear Jim:

This letter provides a summary of a suggested implementation strategy or approach for obtaining WDNR's approval of increased effluent limits. In addition, please refer to RMT's notes for the meeting with WDNR at the OFTI office in Green Bay on 6 April 2006, which were sent to you separately, for further pertinent information.

RMT's overall assessment is that OFTI is eligible for increased effluent limits for BODs and TSS under the federal and state categorical discharge standards, on the basis of the planned increase in deink plant production to a normal level of 175 TPD. However, as stated by Dave Hantz of WDNR, there are "several hoops to jump through" in obtaining WDNR's approval of the increased limits. The key issues associated with the WPDES permit modification process that must be addressed to obtain WDNR's approval of increased effluent limits are listed and discussed in the attached tables. Additional information that explains a portion of WDNR's decision making logic is shown on the attached flow chart from WDNR's Antidegradation Evaluation Worksheet.

At the meeting on 6 April, the WDNR representatives noted that it is OFTI's prerogative to submit an application to revise or reissue the WPDES permit whenever OFTI believes such a request is justified and all of the required forms, data, and other information have been assembled. However, they strongly intimated that the recent recurring permit compliance difficulties and the current WDNR enforcement actions may cause WDNR to defer action on a permit application until these matters are resolved, or to issue a list of significant application deficiencies that would, in effect, put the permit application/modification process on indefinite hold.

RMT's recommended approach is to immediately begin to assemble certain information that is known to be required in the permit application, to continue discussions with WDNR staff, and to proactively manage the application process. Preparation of the permit application package should be completed in parallel with the activities to resolve the issues and questions associated with the wastewater treatment plant performance and capacity, and the current WDNR enforcement actions.

E:\WPMSN\PJ\00-07299\01\1.000723901-001.DOC 4/28/2006

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Mr. Jim Kellam
Partners Concepts Development Inc.
28 April 2006
Page 2

Suggestions for specific near-term actions that should be taken include the following:

- Contact WDNR's surface water quality modeling staff in Madison to confirm the specific modeling requirements to support the antidegradation evaluation of the Oconto River, which is required as part of the permit modification. Modeling early in the process can circumvent potential bottlenecks in the permit revision process.
- Assemble documentation to substantiate that future sustained deink plant production at 175 TPD can and will be achieved.
- Make preliminary plans and preparations for the effluent sampling that will be required to provide data called for in the permit application, and consider initiating the sampling schedule.
- Prepare preliminary calculations and supporting justification for the estimated revised effluent limits that the mill is eligible for under the categorical standards. Consider sending the estimated effluent limits to WDNR for their review and comments, in advance of submitting the full permit application.
- Prepare estimates with supporting documentation for the projected beneficial impacts of the increased deink plant and paper production on the local community and state economy, in terms of additional employment, tax revenue, and other factors.
- Compile documentation to support the market-driven need for deink plant operation at 175 TPD.
- Provide data on the historical mill usage of river water vs. city water to Jeff Haack at WDNR; request J. Haack to provide a preliminary estimate of an Alternate Concentration Limit for mercury that may be included in a reissued permit, if a numerical discharge limit is required. Use the preliminary ACL to determine whether possible future permit compliance problems for mercury may be encountered.
- Prepare calculations to demonstrate that the current annual average effluent quality is \geq 85% of the current permit limits on an annual basis.
- Ensure that the documents currently being prepared in response to WDNR's Notice of Violation issued on 6 March 2006 include information that is consistent with, and supports OFTT's objectives for, the upcoming permit modification process, to the greatest practical degree.

Schedule Considerations

NR 200.05 of the Wisconsin Administrative Code requires a permittee to give notice to WDNR, in the form of a new, complete permit application, "...at least 180 days prior to any facility expansion, production increase, or process modification which will result in a new or increased discharge of one

Mr. Jim Kellam
Partners Concepts Development Inc.
28 April 2006
Page 3

or more pollutants." At the meeting on 6 April 2006, the WDNR representatives indicated that this minimum permit processing timeframe of 6 months is likely to be considerably longer for OFTI's permit application to increase the effluent limits. They cited factors such as general WDNR work backlog; the need for modeling of the Oconto River for the antidegradation evaluation; potential public resistance (requested public hearings, formal challenges, etc.); the potential need to upgrade OFTI's treatment system; and others. For comparison, OFTI's last permit renewal required approximately 18 months from submittal of the completed permit application until WDNR issued the current permit, and no increased limits were requested, there was no public opposition to the renewal, etc.

Given the additional challenges, regulatory requirements, and uncertainties associated with the upcoming permit modification for increased limits, an estimated period in the range of 18 or more months may be realistic for WDNR to complete the permit modification process, after their receipt of the complete application package. It is possible to reduce this time requirement through effective up-front planning and ongoing communications with WDNR, identifying and focusing attention on likely "critical path" or problematic tasks or issues, etc. In addition, it will likely require a minimum of 3 to 4 months for preparation of the permit application, including new effluent sampling, which is in addition to the period required for review of the permit application by WDNR.

Next Steps

We will call you next week, to discuss meeting with you to review the contents of this report, recommendations on the path forward, and how RMT might assist you in attaining a revised permit in a timely manner.

We have enjoyed working with you and the other OFTI representatives in providing assistance for this initial stage of the permit modification process. We look forward to providing continued assistance to OFTI in meeting the upcoming challenges associated with obtaining a revised permit that includes the full discharge allowances that OFTI is eligible for under the state regulations.

Sincerely,

RMT, Inc.



Eric Gredell, P.E.
Project Manager

Oconto Falls Tissue, Inc.
 WPDES Permit Modification Process
 Summary of Key Issues and Factors: Factors Justifying Increased Limits

FACTORS JUSTIFYING INCREASED LIMITS	COMMENTS
<ul style="list-style-type: none"> WWTP - current annual average effluent quality is ≥ 85 percent of permit limits on annual basis. 	<p>The actual monthly average BOD mass discharge over the calendar year 2005 was 98% of the permit limit value. Therefore, this criteria has been met.</p>
<ul style="list-style-type: none"> Market-driven need to use the full existing deink plant capacity of 175 TPD. 	<p>Although this is not a formal decision making criterion in determining eligibility for increased effluent limits under the regulations, it is an important factor in support of OFTI's permit modification request. If OFTI has contractual obligations that will require production at 175 TPD, these should be documented in the permit application submittal.</p>
<ul style="list-style-type: none"> Increased employment opportunities; economic and social benefits to the local community and the state. 	<p>This is a very important decision making criterion that WDNR is required to consider in determining whether increased effluent limits should be approved. OFTI should strongly promote this factor in the permit application submittal, as well as seek support of local and state government representatives and other community leaders.</p>
<ul style="list-style-type: none"> Increase in soluble BOD load to the WWTP that has occurred since the last permit renewal, due to changes in waste paper quality and types. 	<p>This is likely to be a key reason for the increases in BOD and TSS in the effluent and the periodic effluent limit exceedances in 2005. This factor, which is not under OFTI's control, should be described in the permit application submittal, in support of a request for increased effluent limits.</p> <p>However, the increased BOD loading caused by lower waste paper quality is also a factor which may have pushed the WWTP to, or slightly beyond, its design treatment capabilities. This "change in conditions" also gives WDNR more leverage to require improvements to or expansion of the WWTP before they would agree to increased effluent limits.</p>
<ul style="list-style-type: none"> Eligibility for increased effluent limits under the categorical discharge standards based on normal deink plant production at 175 TPD. 	<p>OFTI is eligible for increased BOD and TSS mass effluent limits under the federal and state categorical standards, at a normal deink production rate of 175 TPD. WDNR has not disputed this fact. However, WDNR is likely to strictly apply their interpretation of OFTI's deink pulp production increase as "new source" which will significantly reduce the effluent mass allowances under the categorical discharge standards.</p> <p>It should be recognized that the mass-based contaminant discharge allowances specified in the federal and state regulations for the Pulp and Paper Industry Category, which are expressed as allowable pounds of pollutant per ton of product, are based on USEPA's "model" industry discharger for each regulated manufacturing subcategory. The allowable mass limits for BOD and TSS were calculated by USEPA using their estimates of both the typical achievable effluent concentration and <u>flowrate</u> for each subcategory.</p>

Oconto Falls Tissue, Inc.
 WPDES Permit Modification Process
 Summary of Key Issues and Factors: Factors Justifying Increased Limits (continued)

FACTORS JUSTIFYING INCREASED LIMITS	COMMENTS
<p>■ Eligibility for increased effluent limits under the categorical discharge standards based on normal deink plant production at 175 TPD (<i>continued</i>).</p>	<p>OFTI's current permit limit for monthly average BOD is based on the "conversion factor" of 18.8 lb. BOD/ton product, which was derived by USEPA for the Deink - From Waste Paper subcategory. This factor is based on an assumed achievable effluent quality of 52 mg/L BOD at a flow of 3.47 MGD. Due to water conservation practices, OFTI's current monthly average effluent flowrate is significantly lower than 3.47 MGD. This is why OFTI has normally been able to meet the current permit BOD limit while producing an effluent that averages in the range of 200 mg/L BOD.</p> <p>This indicates that OFTI is using significantly less water in the production processes than USEPA's "model" industry that was the basis for their calculated effluent allowances. OFTI can achieve the mass-based discharge limits allowed under both federal and state regulations by achieving water use conservation to "offset" a higher effluent concentration than USEPA's model discharger, and OFTI should be allowed to use this type of wastewater management approach to meet their permit compliance obligations. In other words, a case can be made to WDNR that it is inequitable to, in effect, penalize OFTI for accomplishing more effective water conservation than most comparable deink tissue mills, by not allowing OFTI to discharge the full BOD mass allowance that the mill is eligible for under the categorical standards.</p> <p>Rather than acknowledge that OFTI has this wastewater management prerogative, WDNR has focused their attention on a comparison of OFTI's WWTP effluent concentration performance with that of other Wisconsin paper mills that, presumably, use the activated sludge process as their primary treatment method, yet ignoring OFTI's improved water conservation practices. In essence they are applying a "best available technology" type rationale to an effluent BOD concentration "limit" when <u>there is no limit for concentration.</u></p>

ST PAPER 1616

Oconto Falls Tissue, Inc.
 WPDES Permit Modification Process
 Summary of Key Issues and Factors: Factors Justifying Increased Limits (continued)

FACTORS JUSTIFYING INCREASED LIMITS	COMMENTS
<p>■ Eligibility for increased effluent limits under the categorical discharge standards based on normal deink plant production at 175 TPD (<i>continued</i>).</p>	<p>This issue will probably have to be addressed directly with WDNR in the near future, either as part of the permit modification process, or under the current enforcement action activities. It may be possible to make a case to WDNR that there is no state regulation that mandates a specific treatment performance efficiency for any particular type of wastewater treatment process or equipment, including the type of physical/chemical and biological treatment unit operations in use at OFTI. As long as OFTI's WWTP is being operated and maintained efficiently and conscientiously; is shown to be capable of maintaining the effluent quality in a consistent, controllable range (i.e., the current wide swings in effluent concentrations must be addressed); and can consistently meet the effluent limits that OFTI is eligible for under the federal and state regulations, then WDNR has no basis to expect or require a higher level of performance from OFTI.</p> <p>It must be noted, however, that other key issues, such as the Antidegradation Demonstration and the river water quality standards that will be calculated by WDNR, must be successfully addressed before the technical argument described above regarding the WWTP performance expectations could be pursued with WDNR.</p>

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Oconto Falls Tissue, Inc.
 WPDES Permit Modification Process
 Summary of Key Issues and Factors: Potential Obstacles or Permitting Delays

POTENTIAL OBSTACLES OR PERMITTING DELAYS	COMMENTS
<ul style="list-style-type: none"> WWTP - uncertain capacity for increased loading. 	<p>This is a key issue that must be addressed before WDNR is likely to act on a permit modification request for increased effluent limits. The findings of the current WWTP study being performed for OFTI by McMahon Engineering will be important for decisions regarding how and when to proceed with the formal permit application process. The deink plant production trials at 175 TPD recently performed by OFTI hopefully provided data that indicate whether the system will be capable of handling the increased contaminant loadings, if available, such data should be included in the permit application.</p>
<ul style="list-style-type: none"> WWTP - historical poor treatment performance compared with other Wisconsin paper mills. 	<p>WDNR is focusing considerable attention on this factor. For the WDNR permit writer to "sign-off" on the antidegradation evaluation, he will have to be able to answer "Yes" to the following questions (per WDNR's evaluation worksheet):</p> <p>"Were the treatment facilities maintained in good working order?"</p> <p>"Were the treatment facilities operated and maintained as efficiently as possible?"</p> <p>The permit writer must also make the following determination before increased limits per the categorized standards would be considered:</p> <p>"The existing wastewater treatment facilities do not have the treatment capability to treat the proposed increased discharge and maintain treatment levels sufficient to meet the existing permit limitations."</p> <p>If WDNR determines that the existing WWTP has the capability to treat the proposed increased BOD loading on the WWTP from operation at 175 TPD, WDNR would not allow an increase in the effluent limits. However, a finding that the WWTP does not have the capability to treat the increased BOD loading would likely trigger a requirement to upgrade the WWTP before the increased effluent limits allowed under the categorical standards would be approved in a new or revised permit.</p> <p>Refer to the comments under the heading "Factors Justifying Increased Limits" for more information on this topic.</p>

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Oconto Falls Tissue, Inc.
 WPDES Permit Modification Process
 Summary of Key Issues and Factors: Potential Obstacles or Permitting Delays (continued)

POTENTIAL OBSTACLES OR PERMITTING DELAYS	COMMENTS
<ul style="list-style-type: none"> Public resistance. 	<p>WDNR has repeatedly noted that they expect public attention and possibly resistance may occur during the formal public comment period for a modification of OFTI's permit to allow increased effluent limits, particularly if a variance and ACL for mercury are included in the proposed permit.</p> <p>Proactively working with the community and its leaders to inform them of the reasons for the permit modifications and that OFTI is proactively protecting the environment will provide balance to public input to the process.</p>
<ul style="list-style-type: none"> Potential lack of assimilative capacity in the river for increased effluent loading (antidegradation problems). 	<p>WDNR has indicated that their initial check of current conditions shows the Oconto River may not have any remaining assimilative capacity to accept increased discharge loading from OFTI. They also noted that the antidegradation determination would likely require extensive modeling of the potential cumulative effects of all currently allocated (permitted) pollutant discharges on the Oconto River water quality. This modeling is normally performed by WDNR's staff in Madison, and according to WDNR, may require 6 to 12 months or more to complete.</p> <p>It may be possible to shorten this time requirement somewhat if OFTI offered to perform the river modeling and submit the results to WDNR for review and confirmation.</p>
<ul style="list-style-type: none"> Potential requirement for mercury effluent limit (ACL) if the permit revoke-and-revise approach is used. 	<p>After OFTI sends information on the historical mill usage of river water vs. city water to Jeff Haack (WDNR), as discussed at the meeting on 6 April 2006, J. Haack should be contacted and requested to provide a preliminary estimate of an ACL for mercury that may need to be included in a reissued permit. This will allow OFTI to determine whether possible future permit compliance problems for mercury may be encountered.</p>
<ul style="list-style-type: none"> Updated water quality standards for the Oconto River to be calculated by WDNR as part of the permit modification process. 	<p>The current water quality standards for the Oconto River for contaminants in OFTI's discharge are not expected to be an obstacle for permit modification, other than a possible permit limit for mercury, as noted above. However, the calculation methods and criteria used by WDNR change periodically. The potential exists that the updated water quality standards calculated by WDNR may affect constituents present in OFTI's effluent that are not addressed in the current permit.</p> <p>Communications with the WDNR staff who will perform the water quality calculations (probably Jeff Haack) prior to and during the water quality standards calculation process will provide opportunities for OFTI to facilitate the process and to receive early notice of any unexpected developments.</p>

Oconto Falls Tissue, Inc.
 WPDES Permit Modification Process
 Summary of Key Issues and Factors: Potential Obstacles or Permitting Delays (continued)

POTENTIAL OBSTACLES OR PERMITTING DELAYS	COMMENTS
<ul style="list-style-type: none"> ■ Overlap of issues regarding the current WDNR enforcement action and the permit modification process. 	Proactively managing the response to the enforcement action and the permit modification process in a holistic and integrated approach will provide efficiency and help minimize the time needed to resolve both matters, with resulting overall cost reduction.
<ul style="list-style-type: none"> ■ WWTP – requirement to demonstrate at least 4 months of consistent compliance with current permit limits as a demonstration of capacity and efficient O&M. 	Although this factor is related to others noted above, it is important in the short-term, because WDNR may be unwilling to respond favorably and begin acting on a permit revision application for increased limits until this demonstration has been met.
<ul style="list-style-type: none"> ■ Requirement to justify expected sustained deink plant production of 175 TPD on an annual average basis. 	<p>The data collected during the recent production trial should demonstrate the facility's ability to sustain 175 TPD. This data can be used to support the case that the reconfiguration of the WWTP, and subsequent efforts to enhance operations, have improved the overall performance and treatment efficiency of the WWTP as compared to the periods prior to the WWTP enhancements.</p> <p>Refer to the comments under the heading "Factors Justifying Increased Limits" for more information on this topic.</p>
<ul style="list-style-type: none"> ■ How WDNR will determine the allowable production capacity with respect to BPT vs. NSPS. 	It may be possible to make the case to WDNR that the full deink production capacity of 175 TPD should be considered "existing" capacity, with the resulting application of the BPT discharge allowances under the categorical standards. It would have to be documented to WDNR that the basic production facilities with the capability for 175 TPD existed at least at the time the last permit application was submitted, although the associated plant facilities were not configured at that time to support the full production rate.
<ul style="list-style-type: none"> ■ Extensive effluent sampling is required. 	A significant amount of effluent sampling will be required to support the application for either a revised or reissued permit, under conditions that are representative of actual production and WWTP operating conditions at 175 TPD deink production rate. Some of the required sampling parameters are expected to require multiple sampling rounds (over up to 3 months) to provide the data specified by WDNR.

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Oconto Falls Tissue, Inc.
 WPDES Permit Modification Process
 Summary of Key Issues and Factors: Potential Obstacles or Permitting Delays (continued)

POTENTIAL OBSTACLES OR PERMITTING DELAYS	COMMENTS
<ul style="list-style-type: none"> ■ Potential need for upgrade of the WWTP. 	<p>If the conclusions of the ongoing engineering evaluation of the WWTP, or the 175 TPD demonstration trial, are that the WWTP does not have adequate capacity for the current and/or increased contaminant loading, an upgrade or expansion of the WWTP may be necessary. An upgrade of the WWTP would constitute "reviewable modifications" under NR 108, which requires submittal of detailed engineering plans and specifications for the modifications to WDNR for approval, before equipment procurement or construction can commence. If a WWTP upgrade is needed, it may be appropriate to postpone submittal of the permit revision application requesting increased limits to WDNR until the design package for the upgrade is also almost ready for submittal. Therefore, the time required to complete the design package could potentially delay submittal of the permit application.</p>

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Page 4 of 4

FISH & AQUATIC LIFE WATERS - NR 207.04

NOTE: If the department determines that a proposed new or increased discharge will result in lowering of water quality in downstream D.R.W. or a proposed new discharge would result in lowering of water quality in E.R.W., other than for reasons specified in s. NR 207.03(2)(a), water quality based effluent limitations for substances in the new or increased portion of the discharge will be set to prevent the lowering of water quality in the downstream D.R.W. or E.R.W.

NOTE: The department shall determine water quality based effluent limitations using the water quality criteria in ch. NR 102, 103, 104 or 105 for substances in the proposed new or increased discharge whose levels in the receiving water are of lesser quality than the water quality criteria for the receiving water upstream of, or adjacent to, the discharge site.

